Section 7 Results of Fieldwork

7.1 Results of Pedestrian Inspection

The pedestrian survey conducted of the Airport Section 3 project corridor provided useful information although no surface archaeological historic properties were identified. This survey contributed to compiling an overview of the geographic setting, topography, and potential constraints to completing individual excavation trenches. The pedestrian survey involved 100% surface coverage of the project corridor shown in Figure 36 and Figure 37. These two figures also show the locations of individual excavation trenches (T-001 through T-047) and the locations of subsurface cultural resources or historic properties identified during subsurface testing. Figure 38 through Figure 64 show the subdivision of the corridor into 26 map sheets (J4 through J30) to facilitate presentation of individual or closely-grouped excavation trenches along the corridor. Figure 65 through Figure 91 illustrate surface conditions, topography, and soil types along the project corridor.

The pedestrian survey revealed that the project corridor has been extensively impacted by previous infrastructure work, including historic and modern roads, buildings, utilities, and landscaping activities. An overview of the survey conditions and findings along the length of the corridor is briefly summarized below.

Beginning at its northern extent, Figure 65 and Figure 66 show the recent road bridge, and landscaping work that characterize the area where Kamehameha Highway crosses Hālawa Stream just south of the intersection of Kamehameha Highway and Kalaloa Street/Arizona Memorial Place. Also present are areas where significant sculpturing of the land surface has occurred (Figure 67 and Figure 68).

Figure 69 and Figure 70 show two significant fingers of rock land (RL) with little soil development bracketing a small swale of relatively fertile Hanalei silty clay in the immediate vicinity of Kamehameha Highway and Radford Drive (see Figure 5). The Pearl Harbor Naval Base Station lies within the silty clay area between the two ridges of rock land outcrop (Figure 71 and Figure 72).

In the vicinity of Center Drive, Kamehameha Highway ascends a significant rise (Figure 73). The stretch between the western entrance of Joint Base Pearl Harbor-Hickam and the Honolulu International Airport is at the confluence of the H-1 Freeway on- and off-ramps, Kamehameha Highway, and Nimitz Highway (Figure 74 through Figure 77). The project corridor approaches the Honolulu International Airport heading east on the south side of Nimitz Highway (Figure 78), then heads south on Aolele Street (Figure 79), then turns southeast just *makai* of the Airport Post Office and north of the airport *lei* stands (Figure 80).

The Honolulu International Airport Station, will be located north and east of the interisland terminals and north of the overseas terminal on the southeast corner of the intersection of Ala Auana Street and Ala Onaona Street. The two proposed locations for this station occur east of the *lei* stands. The initial northern location is shown in Figure 81 while an alternative location 60 m to the south is shown in Figure 82.

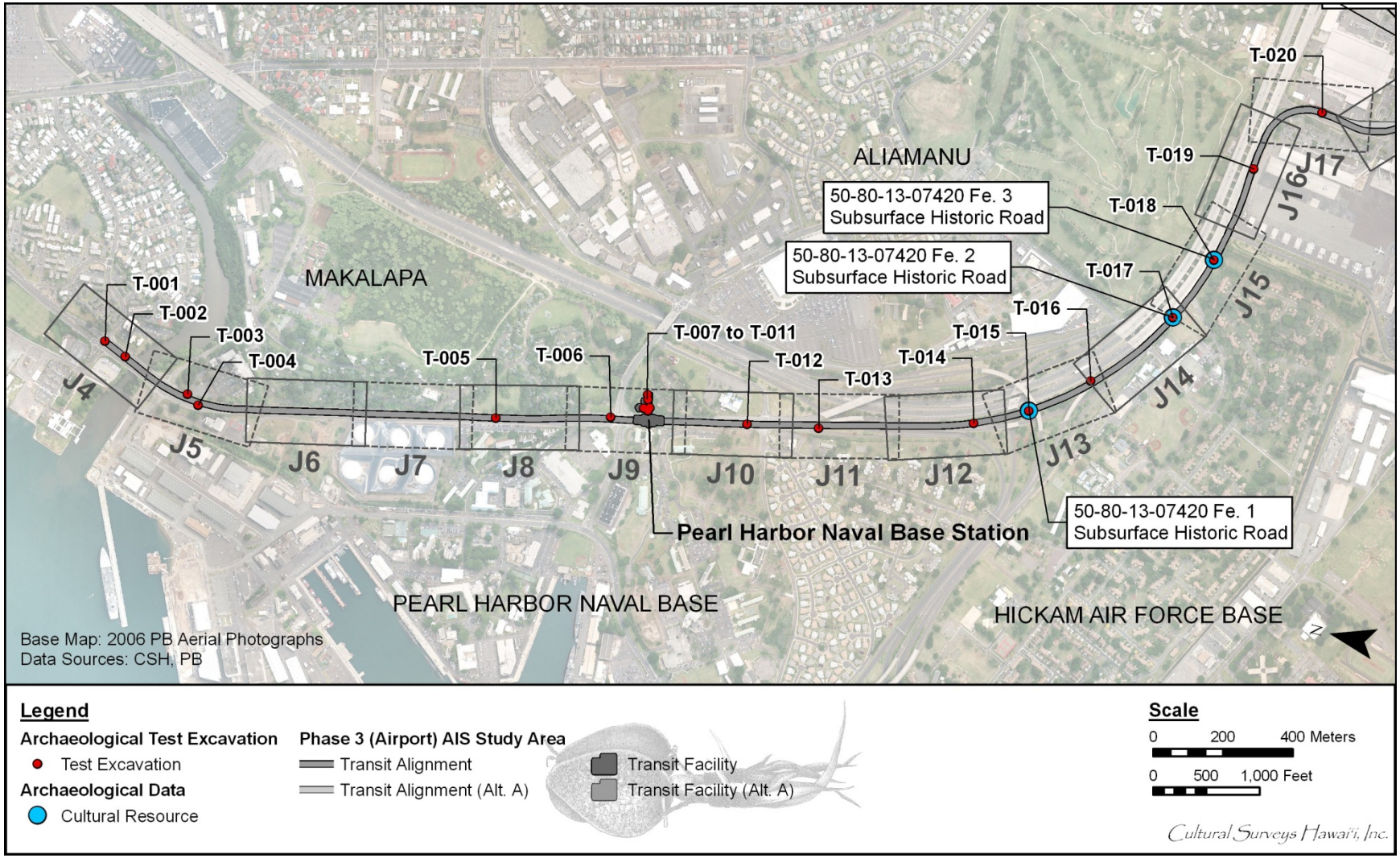


Figure 36. Pedestrian inspection survey area and overall test excavation location map, north half of study area, showing the locations of test excavations T-001 through T-020; note J4 to J17 represent boundaries of smaller study area segments

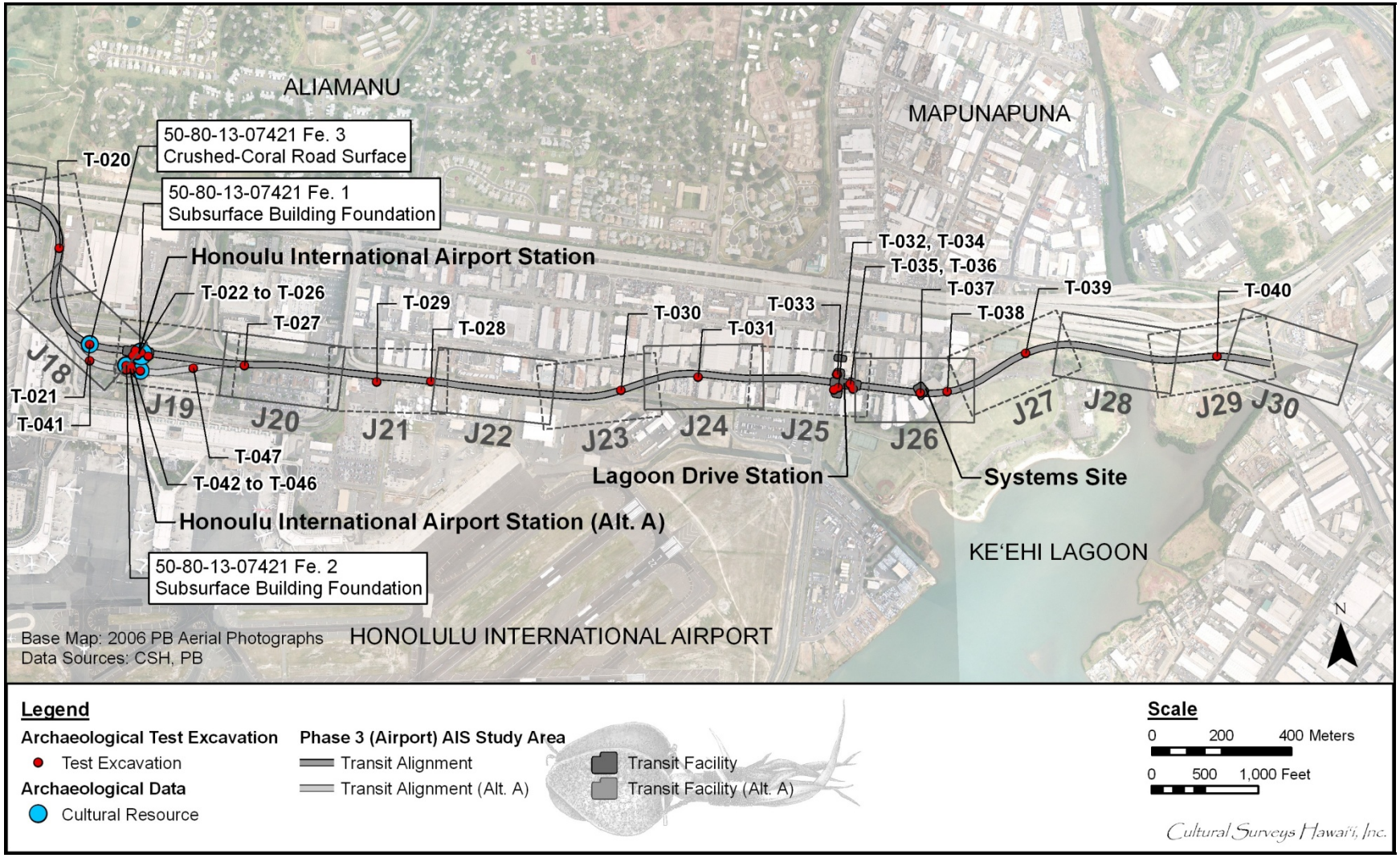


Figure 37. Pedestrian inspection survey area and overall test excavation location map, east half of study area, showing the locations of test excavation T-021 through T-047; note J18 to J30 represent smaller study area segments

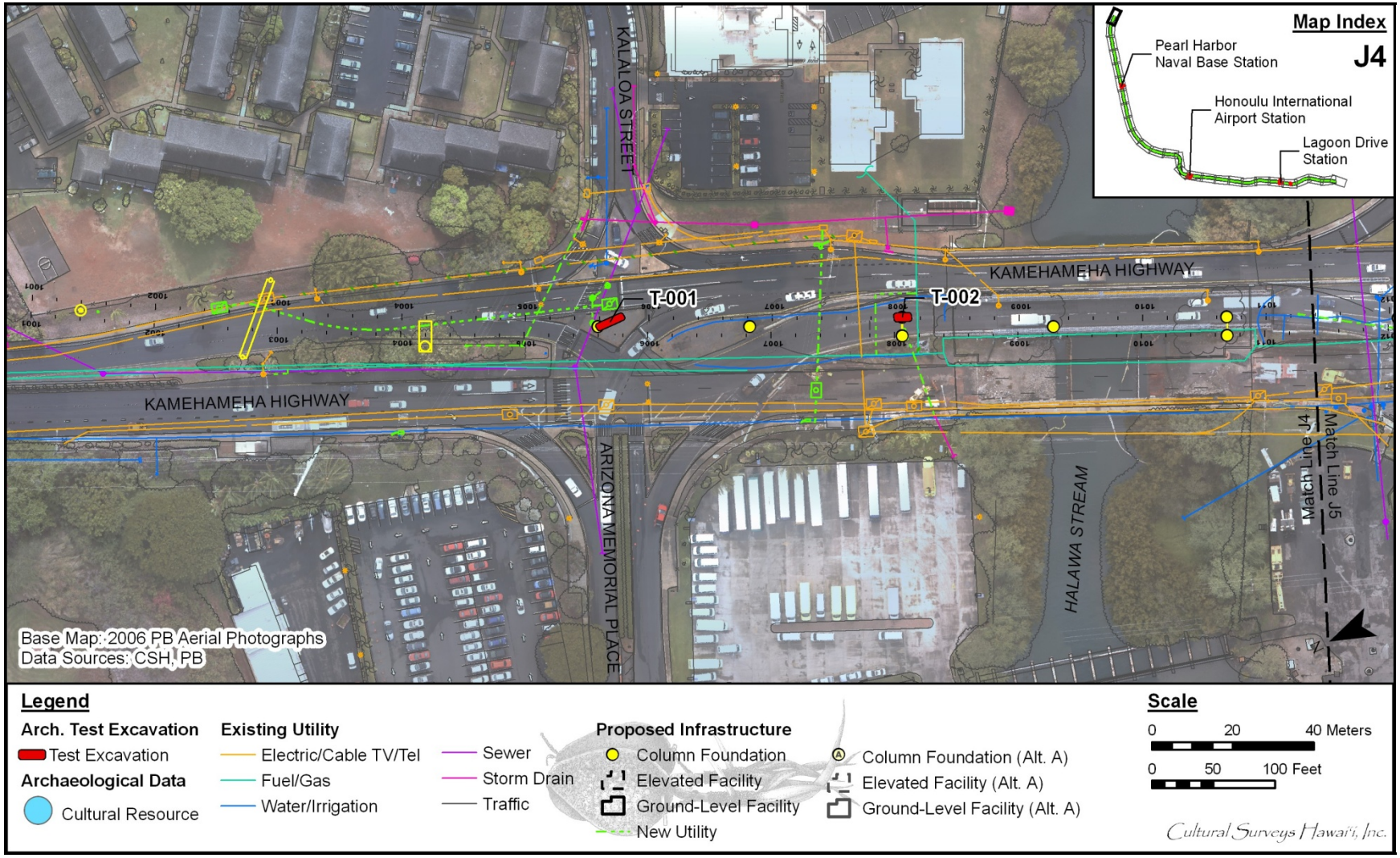


Figure 38. Map Sheet J4 showing the locations of T-001 and T-002 along Kamehameha Highway between Arizona Memorial Place and Hālawa Stream

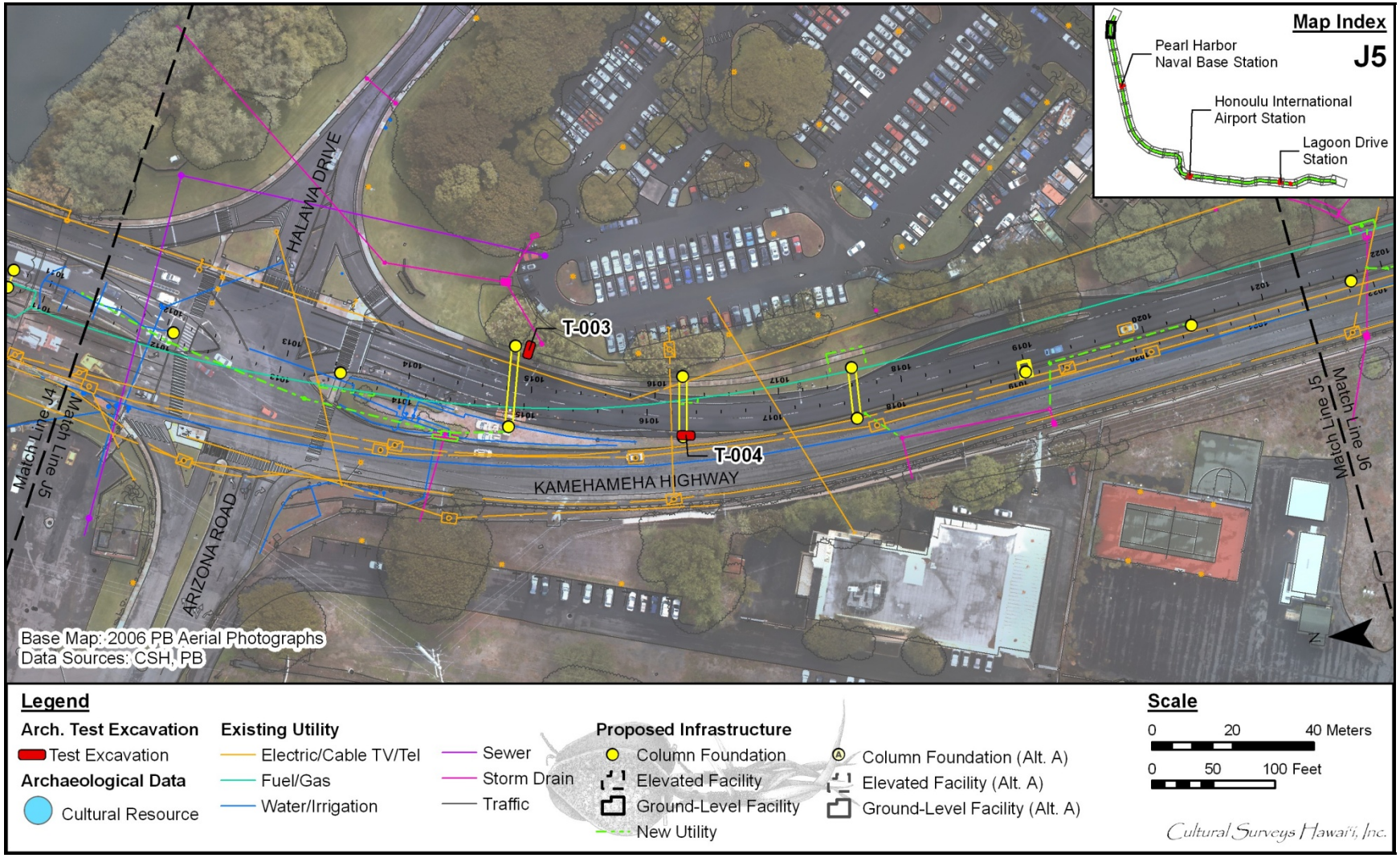


Figure 39. Map Sheet J5 showing the locations of T-003 and T-004 along Kamehameha Highway, south of Hālawa Drive/Arizona Road

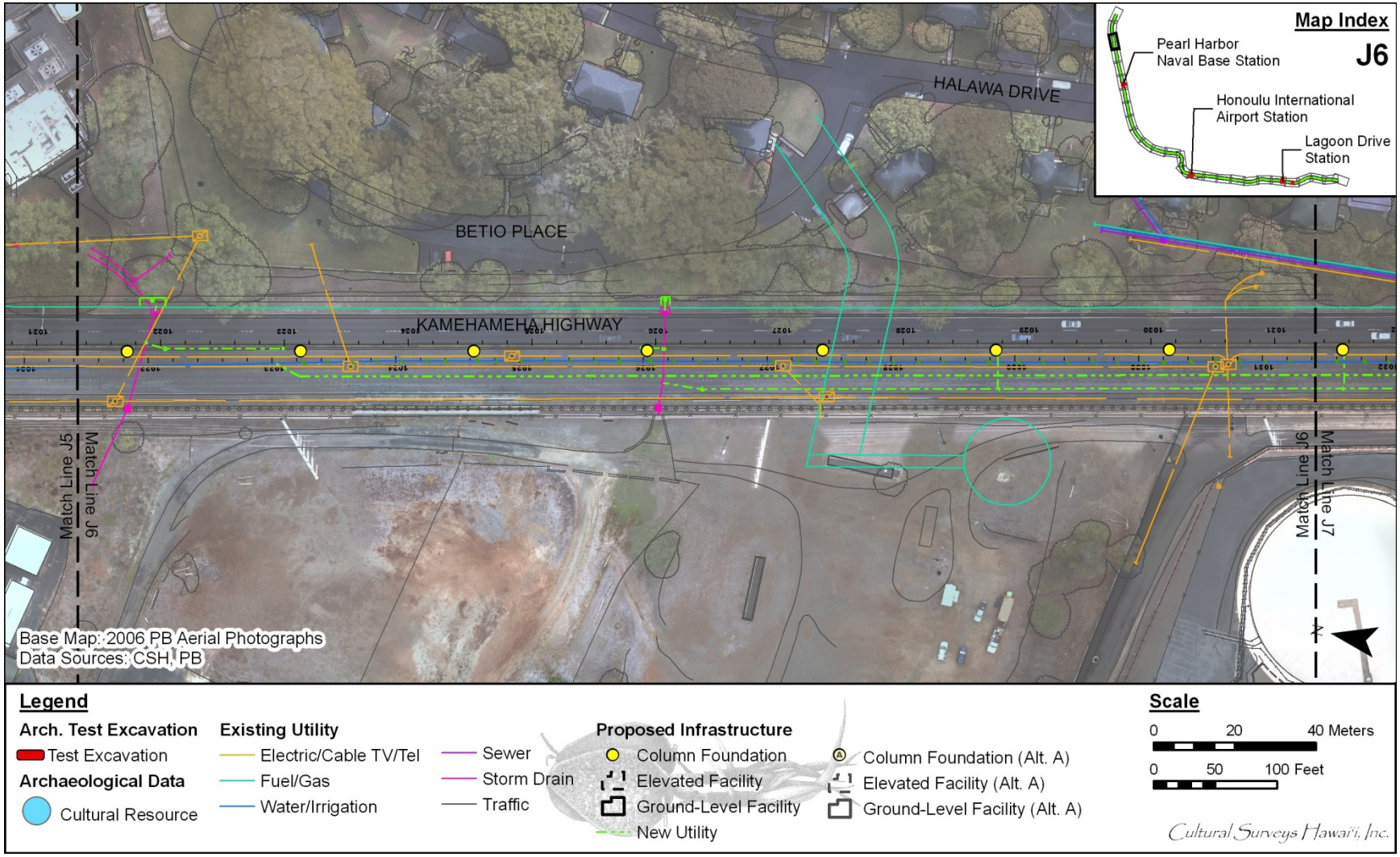


Figure 40. Map Sheet J6 showing the Airport Section 3 corridor along Kamehameha Highway, south of the Hālawa Drive/Arizona Road intersection; note that no subsurface testing was conducted in this segment in accordance with the AISP (Hammatt and Shideler 2011:139)

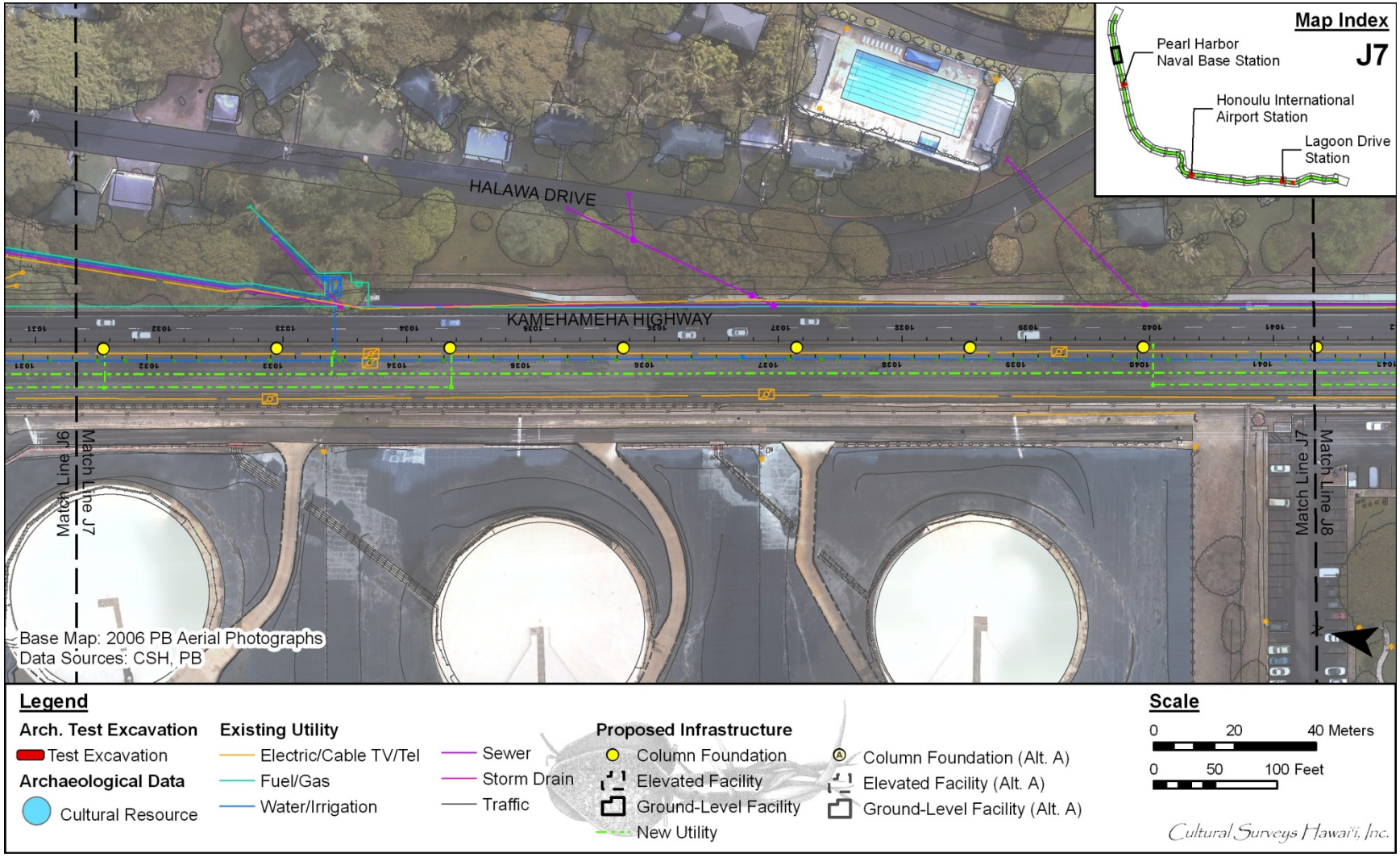


Figure 41. Map Sheet J7 showing the Airport Section 3 corridor along Kamehameha Highway, south of the Hālawa Drive/Arizona Road intersection; note that no subsurface testing was conducted in this segment in accordance with the AISP (Hammatt and Shideler 2011:139)

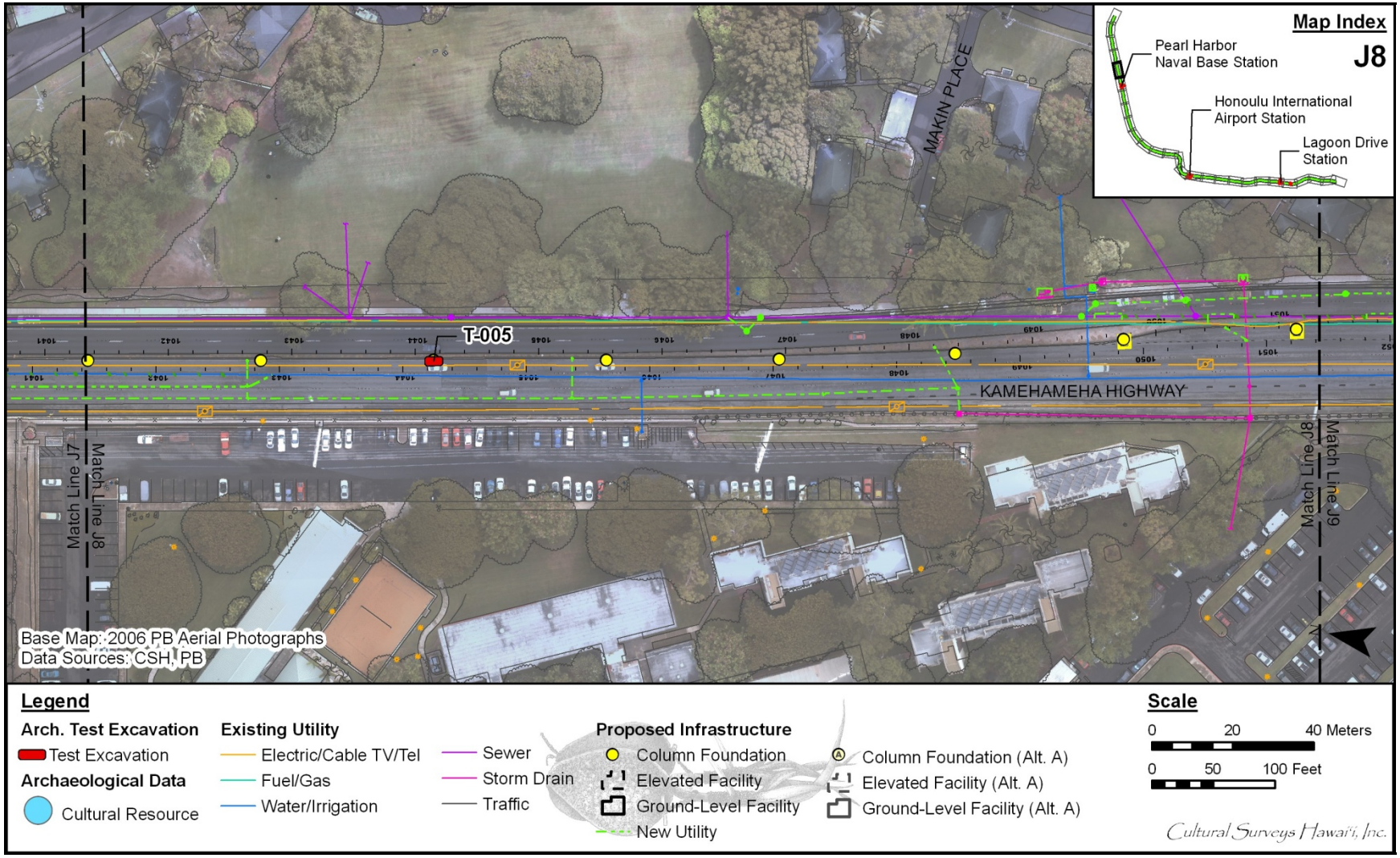


Figure 42. Map Sheet J8 showing the location of T-005 along Kamehameha Highway, approximately 110 m north of the intersection at Makin Place

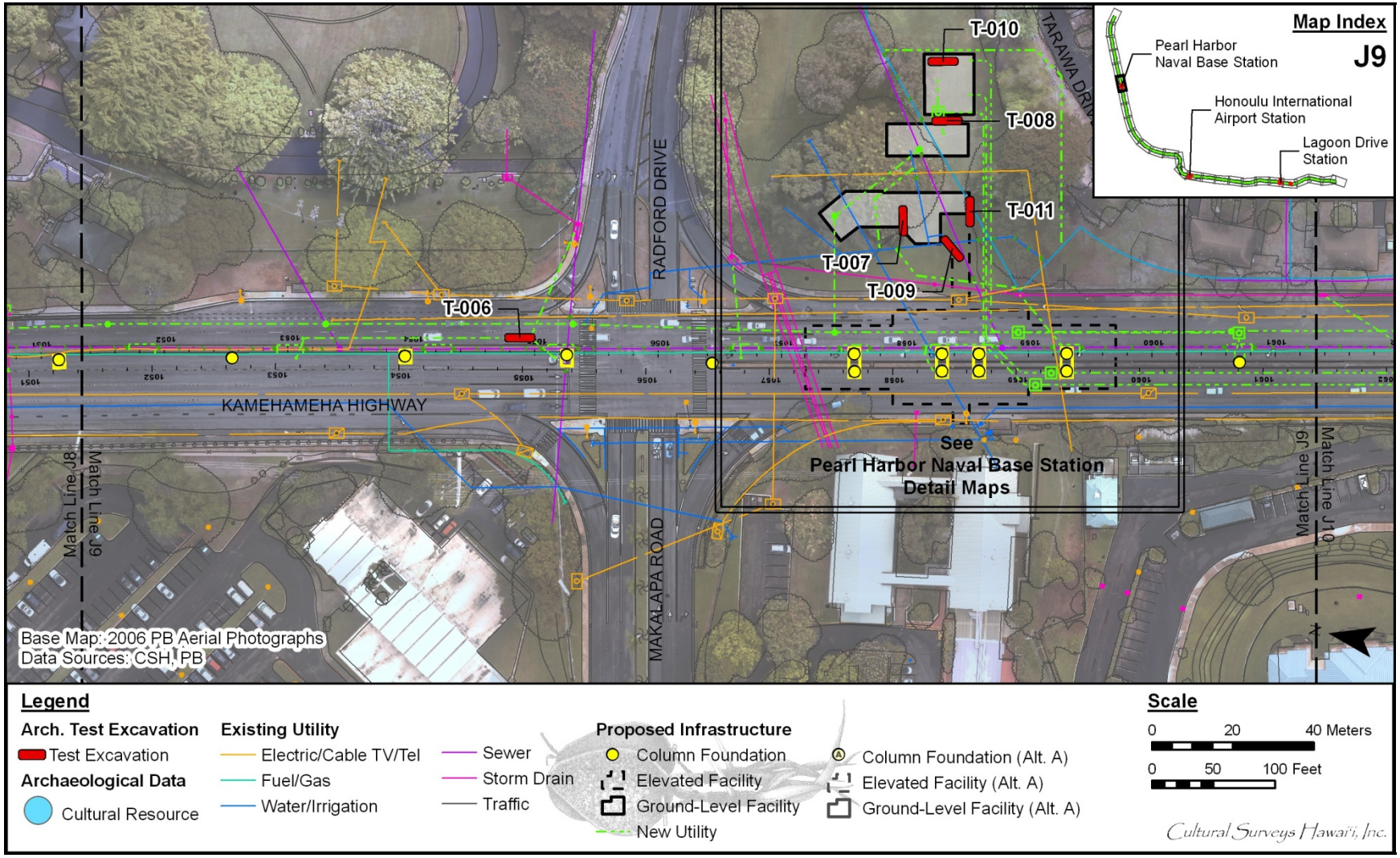


Figure 43. Map Sheet J9 showing the locations of T-006 through T-0011 along Kamehameha Highway in the vicinity of Makalapa Road/ Radford Drive intersection and the adjacent Pearl Harbor Naval Base Station

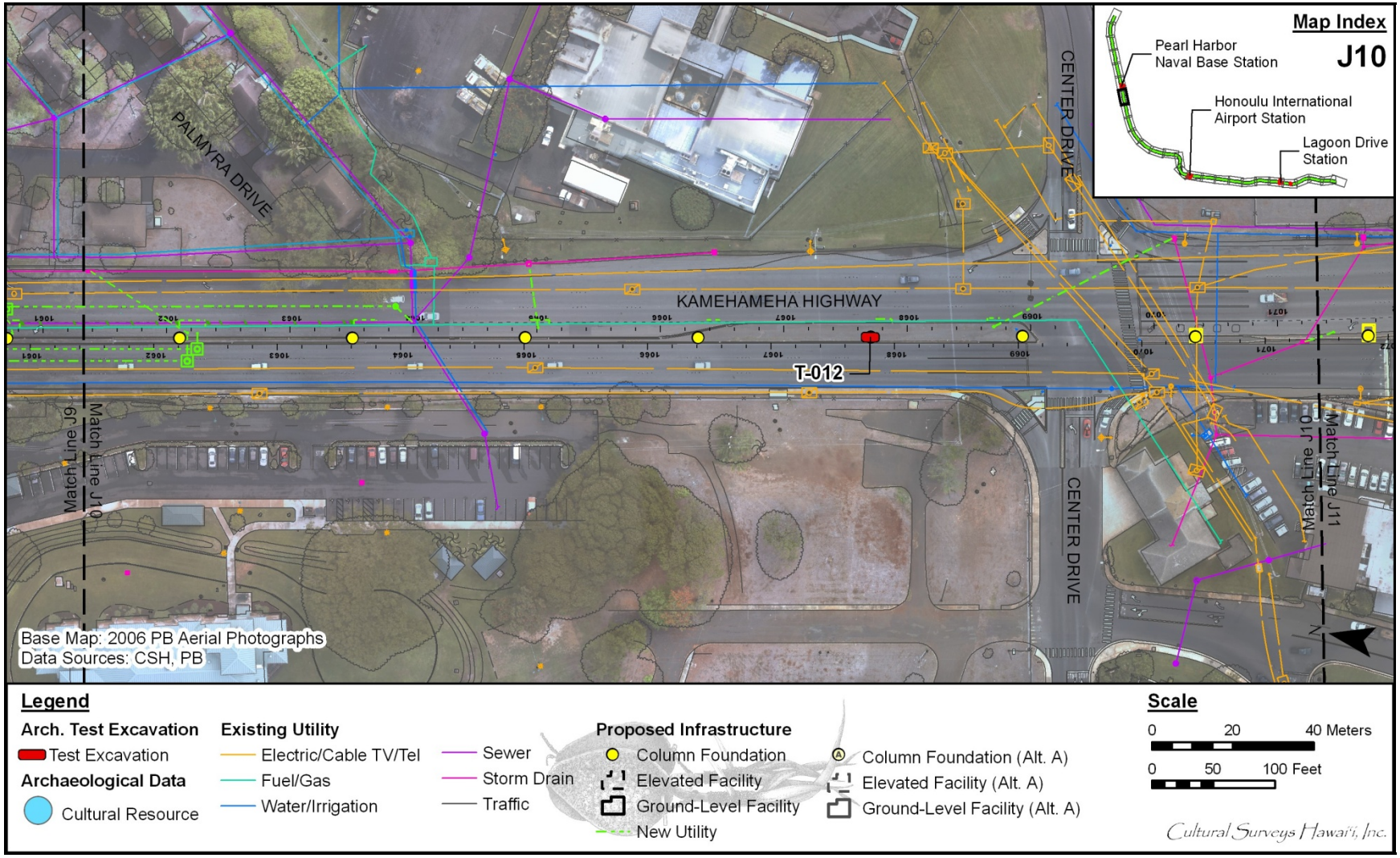


Figure 44. Map Sheet J10 showing the location of T-012 along Kamehameha Highway just north of Center Drive

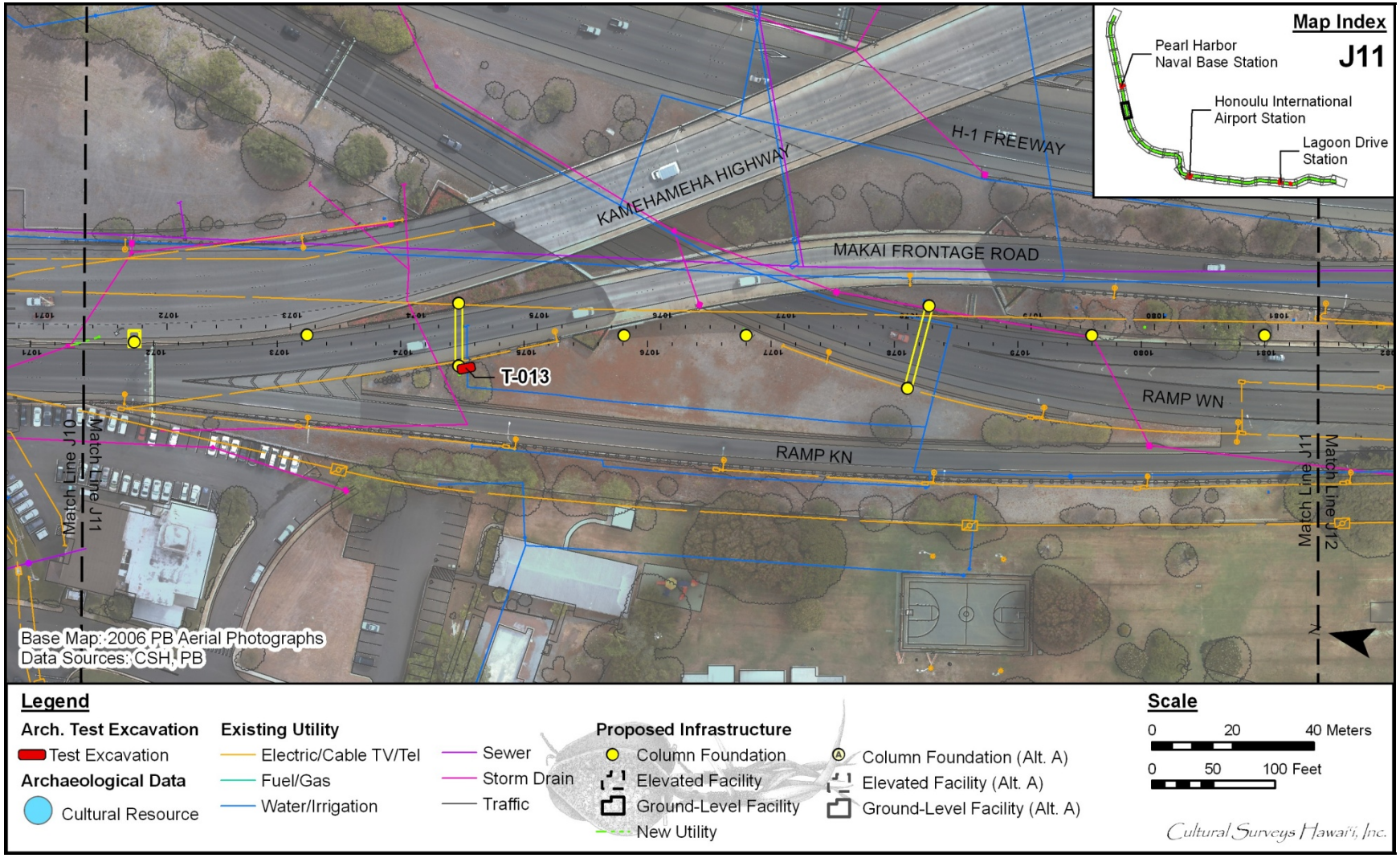


Figure 45. Map Sheet J11 showing the location of T-013 along Makai Frontage Road

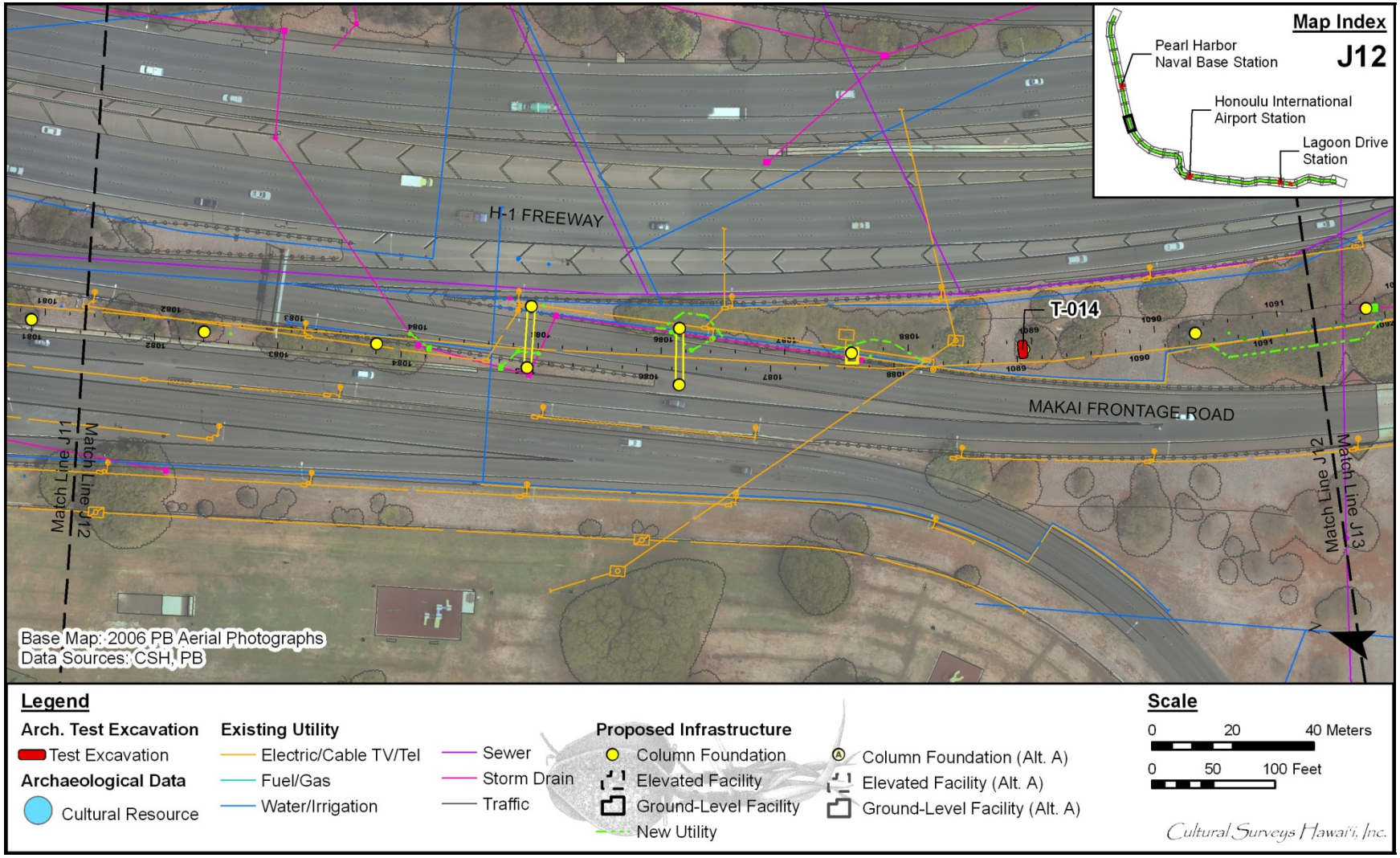


Figure 46. Map Sheet J12 showing the location of T-014 west (*makai*) of the H-1 Freeway and east (*mauka*) of Makai Frontage Road

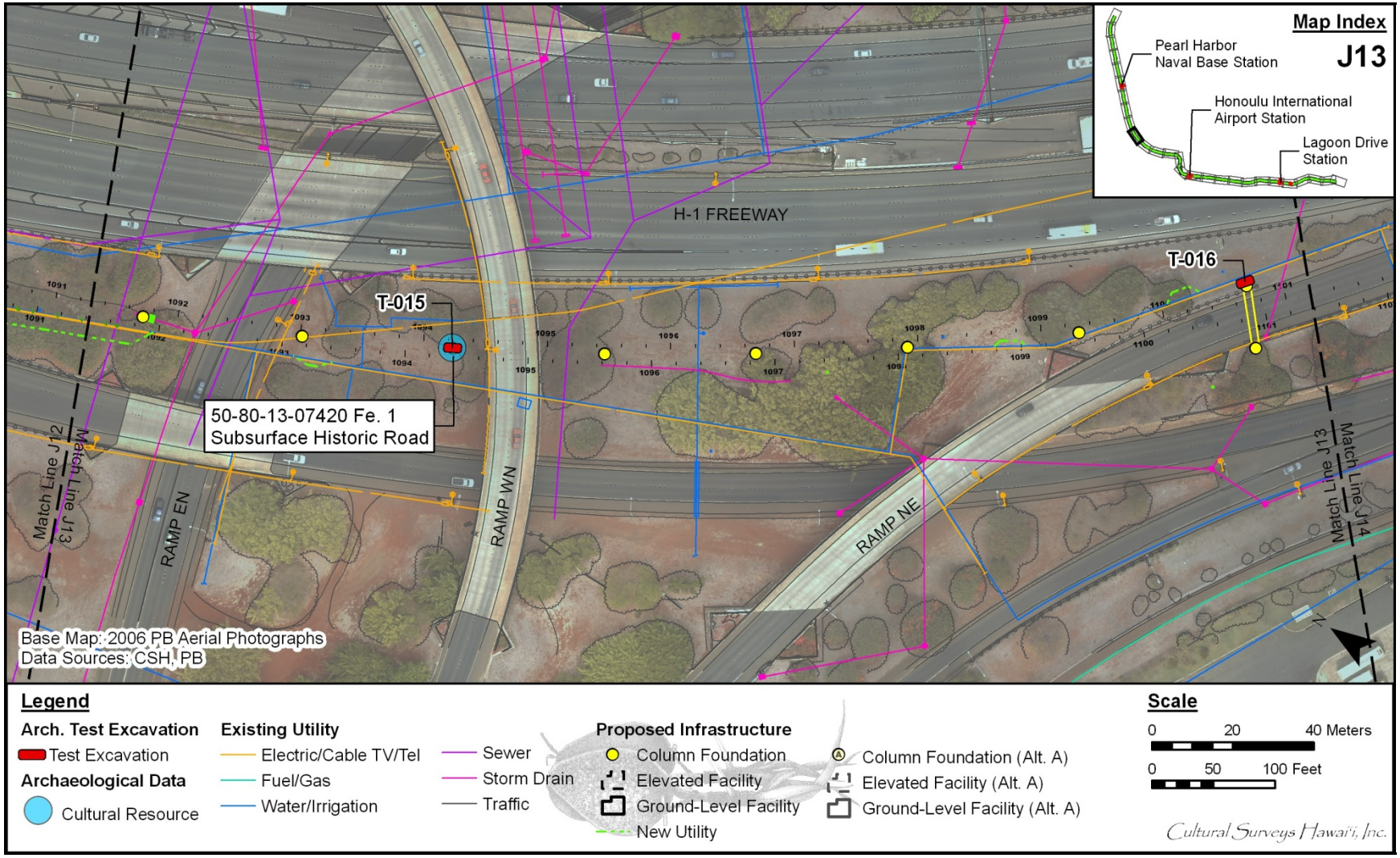


Figure 47. Map Sheet J13 showing the locations of T-015 and T-016 west of the H-1 Freeway

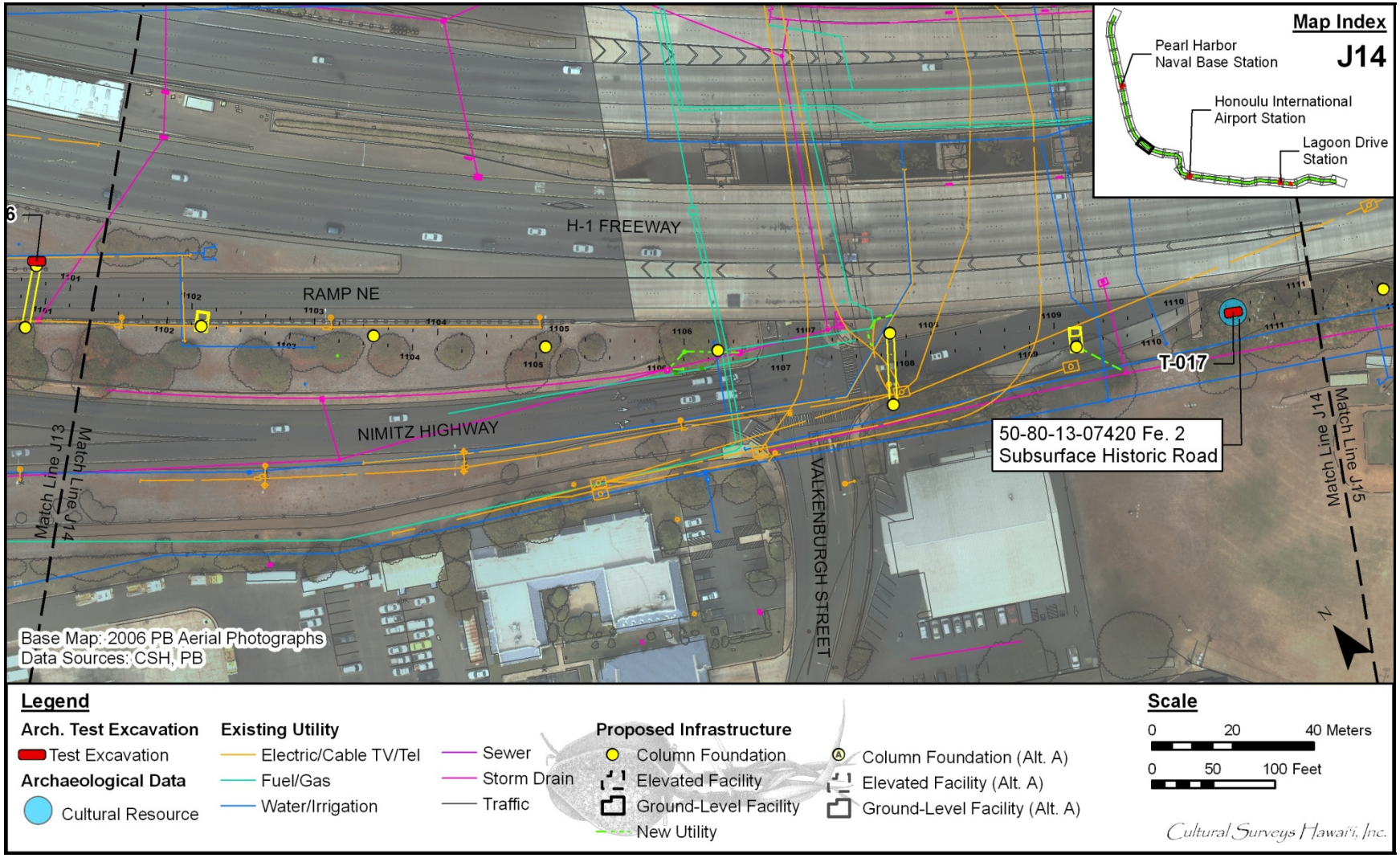


Figure 48. Map Sheet J14 showing the location of T-017 south of the H-1 Freeway and just east of Valkenburgh Street

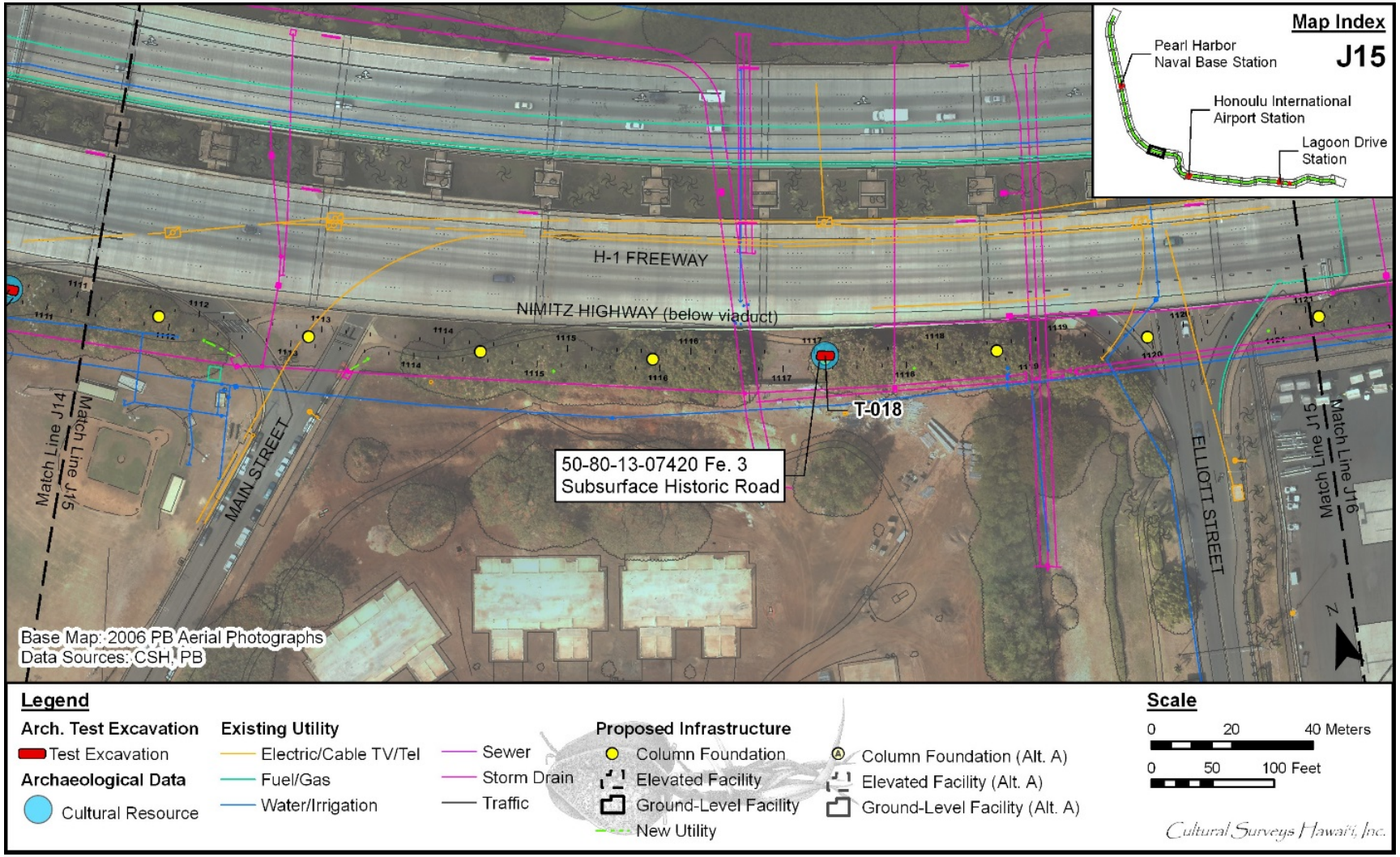


Figure 49. Map Sheet J15 showing the location of T-018 on the south (*makai*) side of the H-1 Freeway, between Main Street and Elliott Street

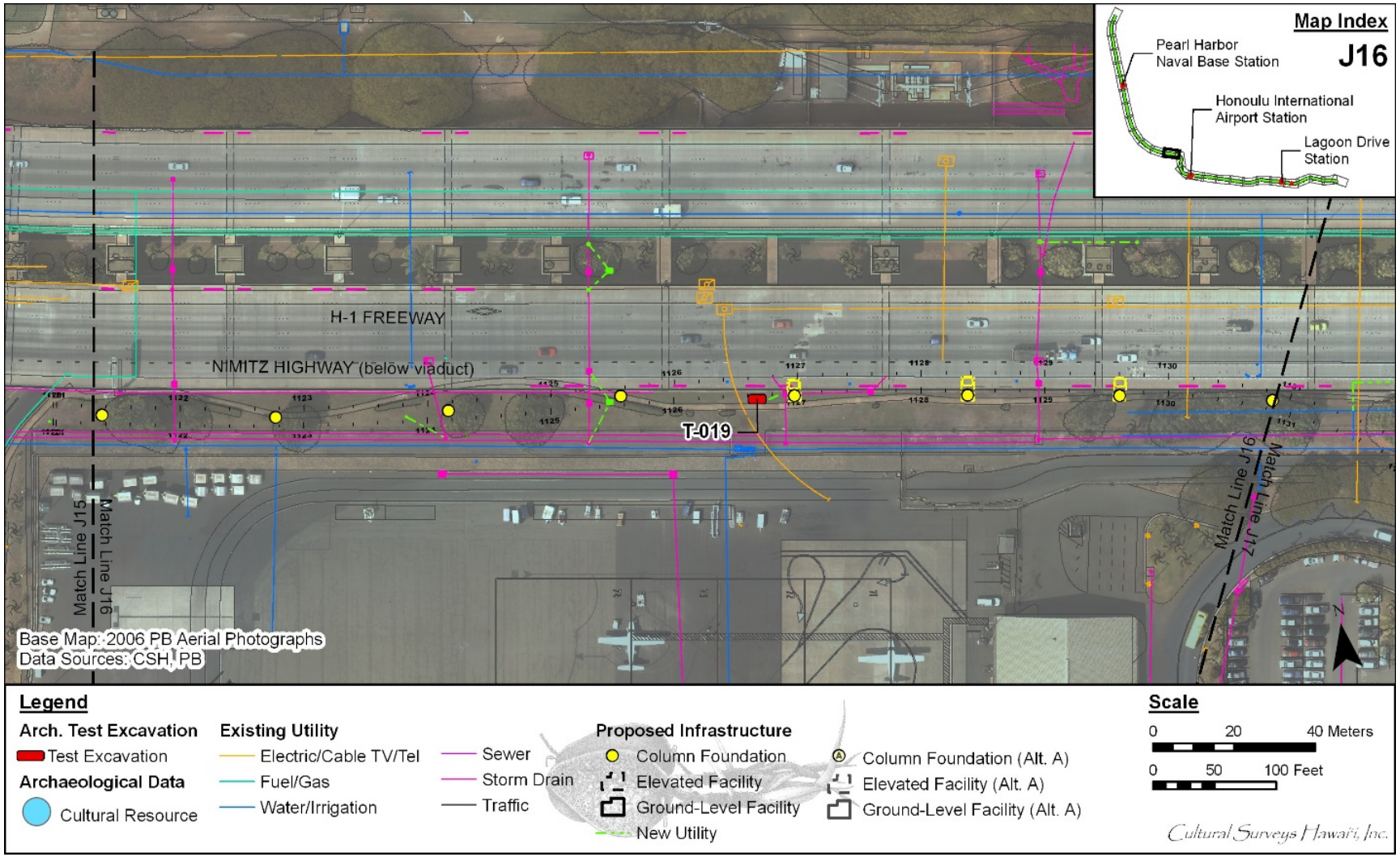


Figure 50. Map Sheet J16 showing the location of T-019 on the south (*makai*) side of the H-1 Freeway

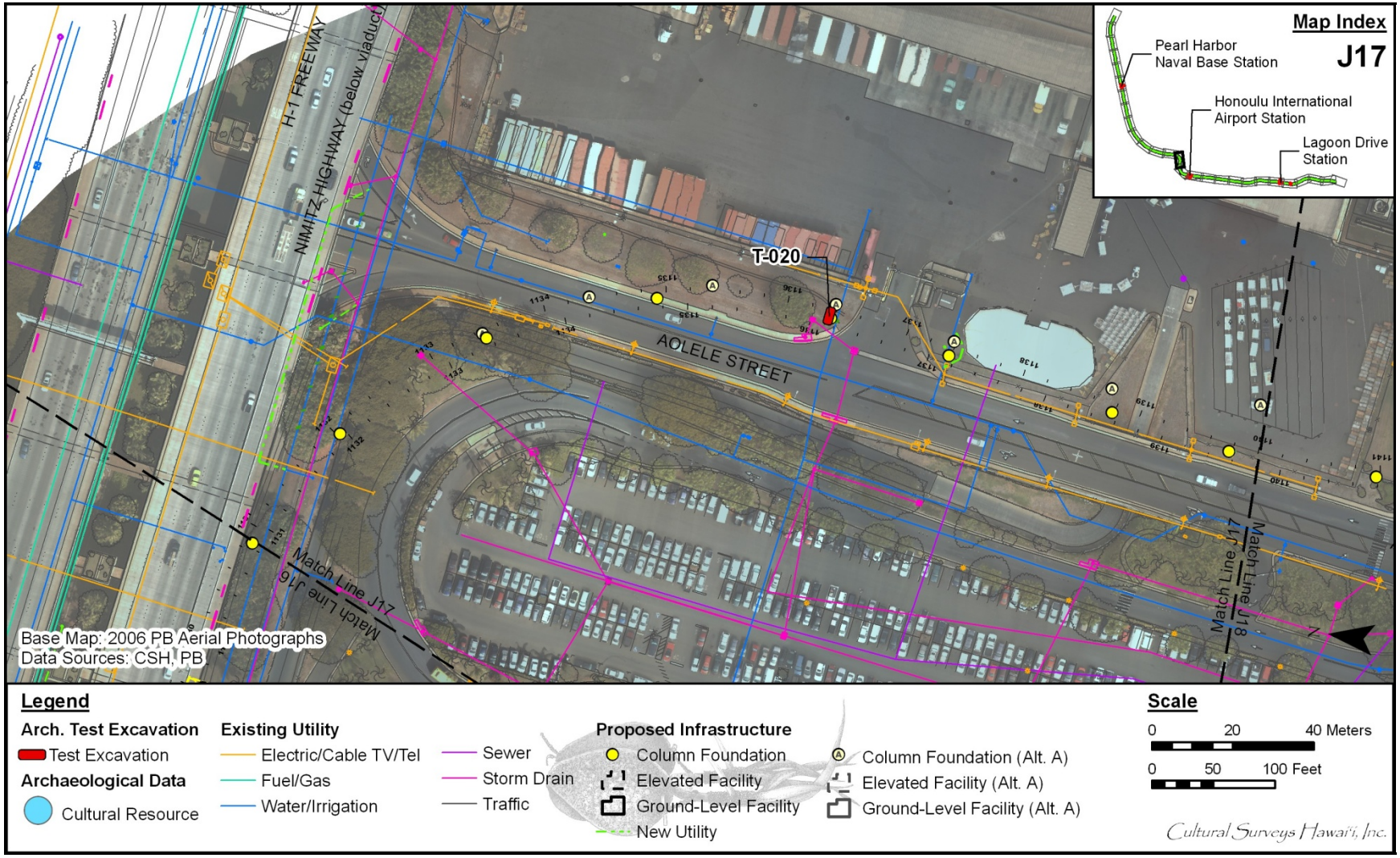


Figure 51. Map Sheet J17 showing the location of T-020 just east of Aolele Street and south of Nimitz Highway

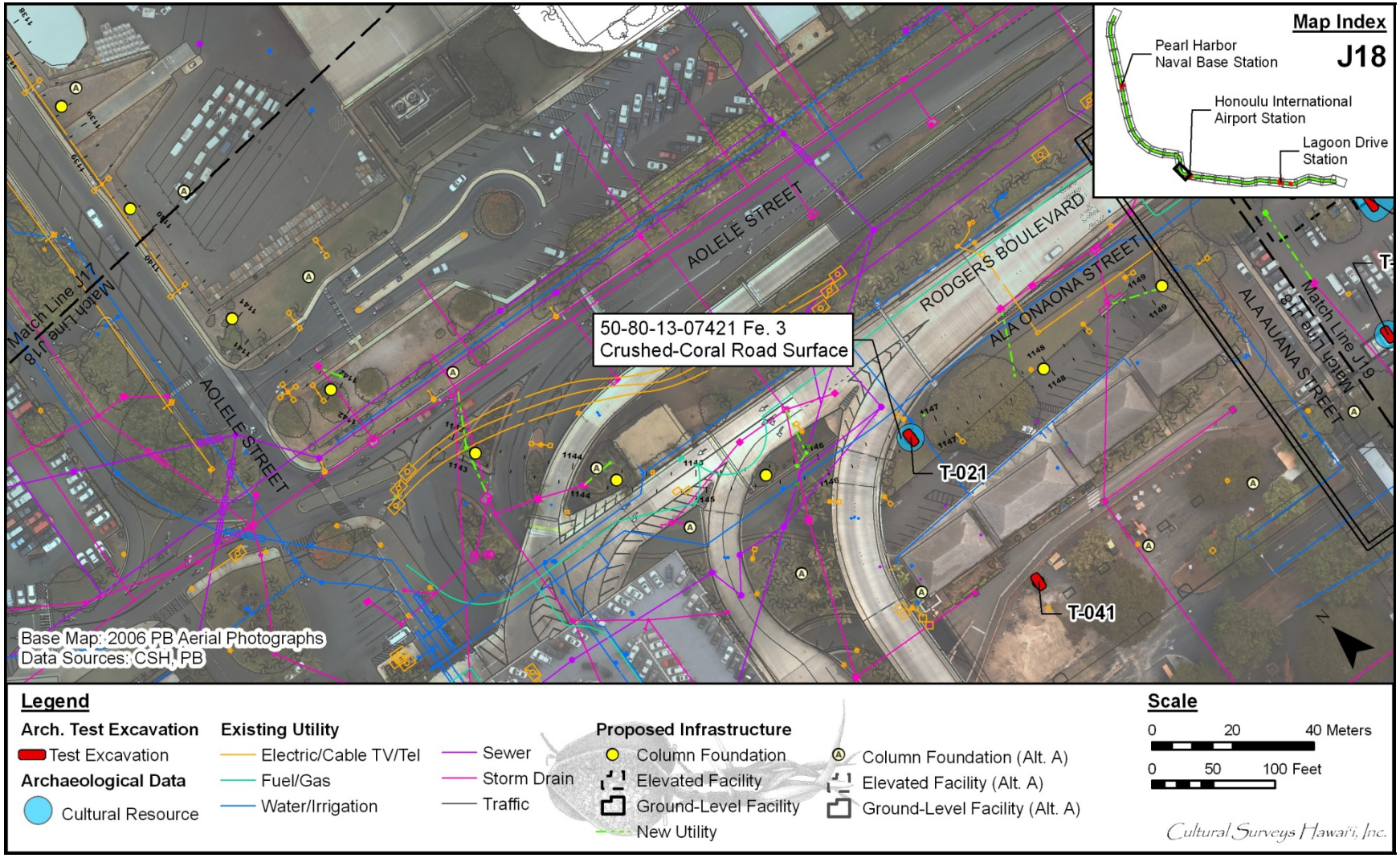


Figure 52. Map Sheet J18 showing the locations of T-021 (the landscaped area underthe Rodgers Blvd. viaduct) and T-041 (the parking lot of the airport *lei* stands); intervening numbered trenches are directly to the east

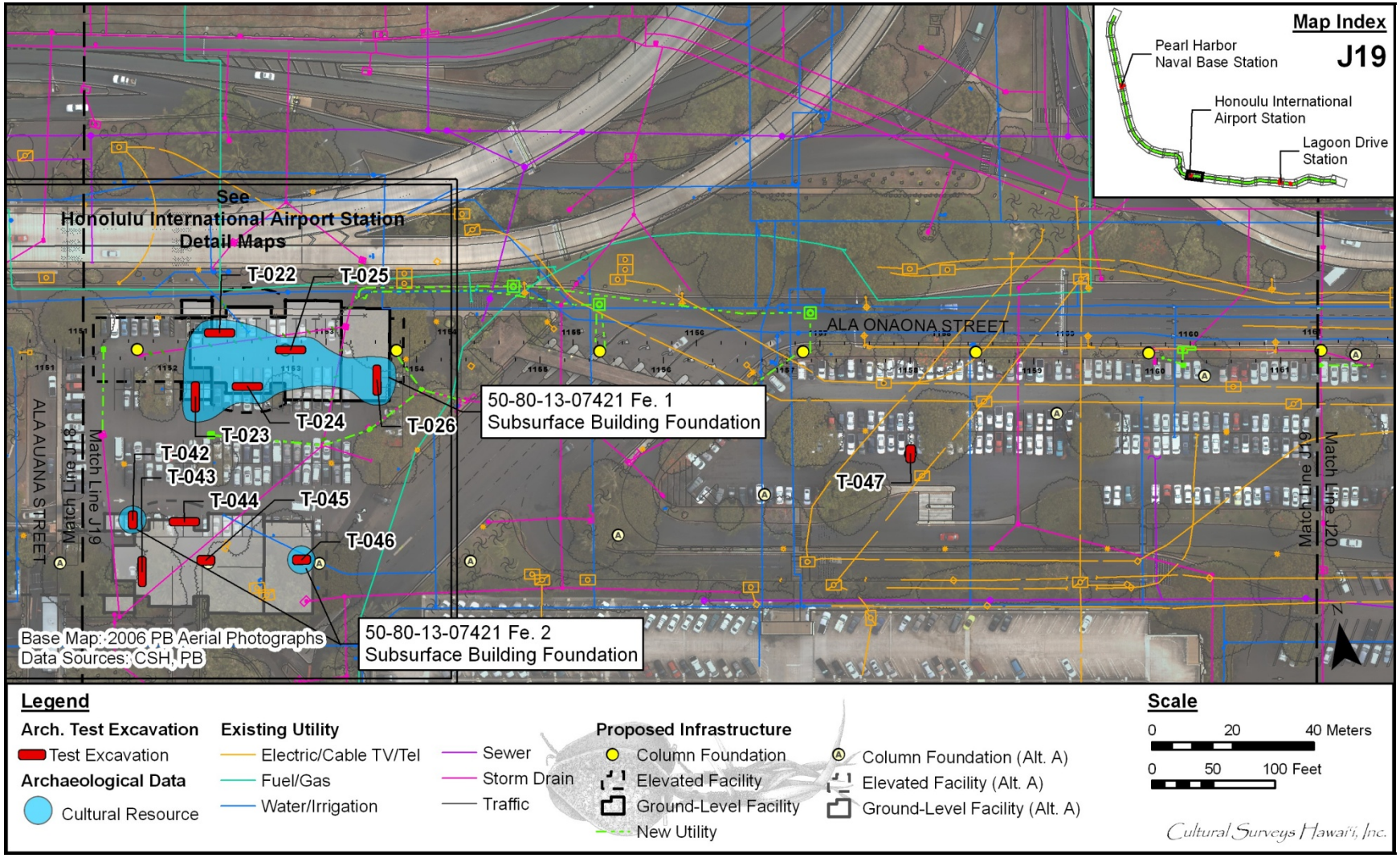


Figure 53. Map Sheet J19 showing the locations of T-022 through T-026 and T-042 through T-046 in the proposed Honolulu International Airport Station and T-047 to the east along Ala Onaona Street

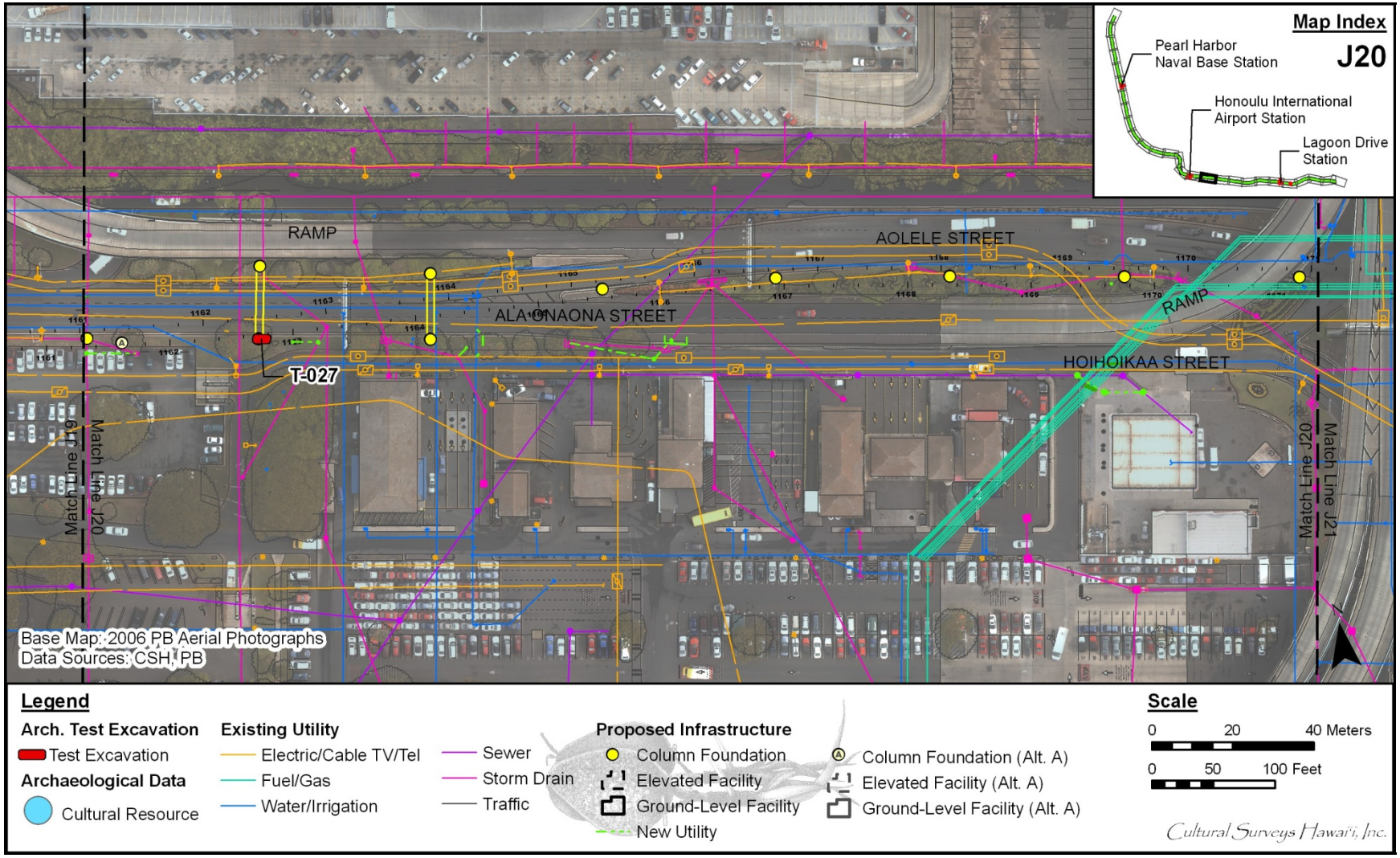


Figure 54. Map Sheet J20 showing the location of T-027 on Ala Onaona Street

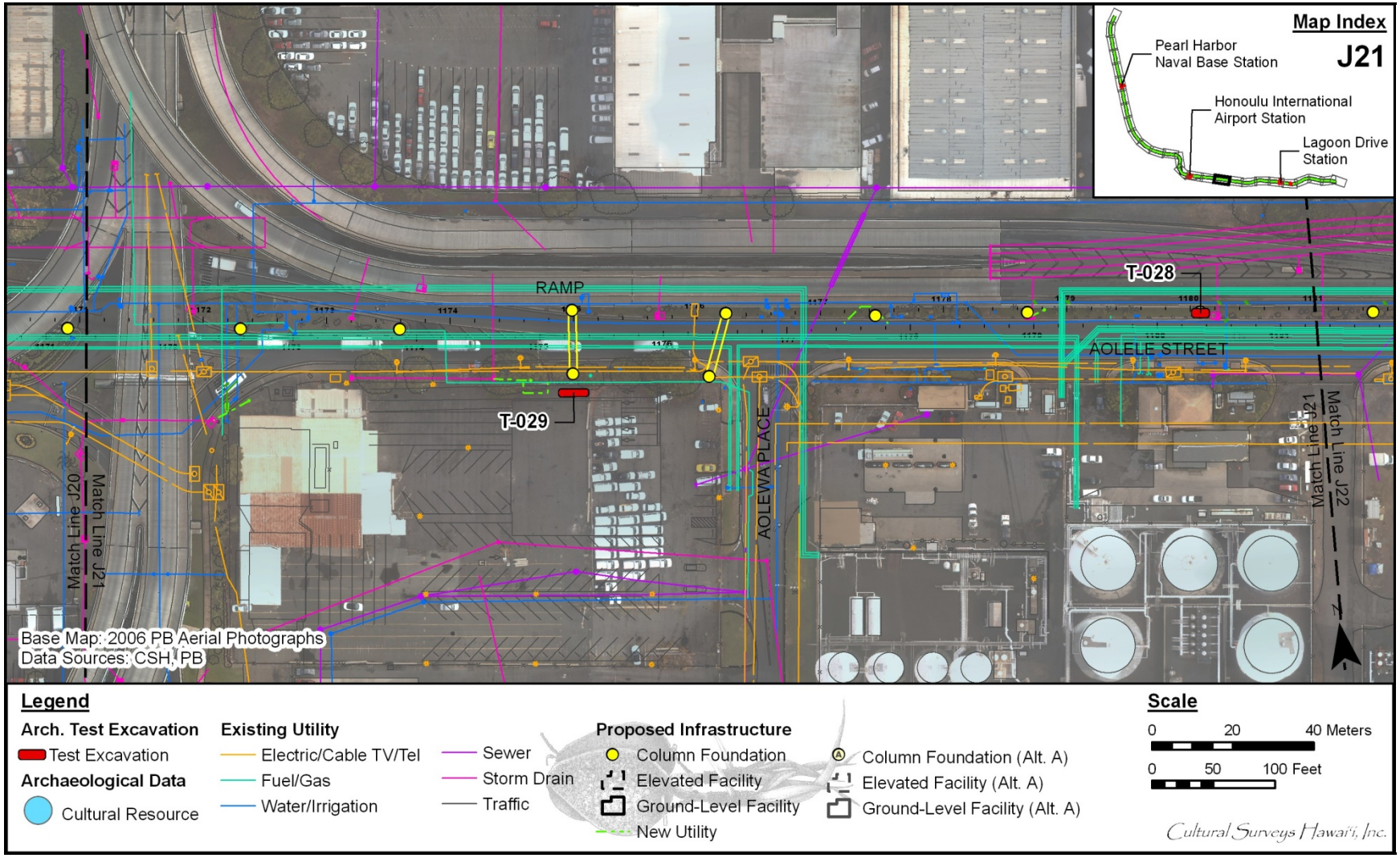


Figure 55. Map Sheet J21 showing the location of T-028 on the east side of Aolewa Street near the intersection with Aolewa Place and the location of T-029 on the west side of Aolewa Street)

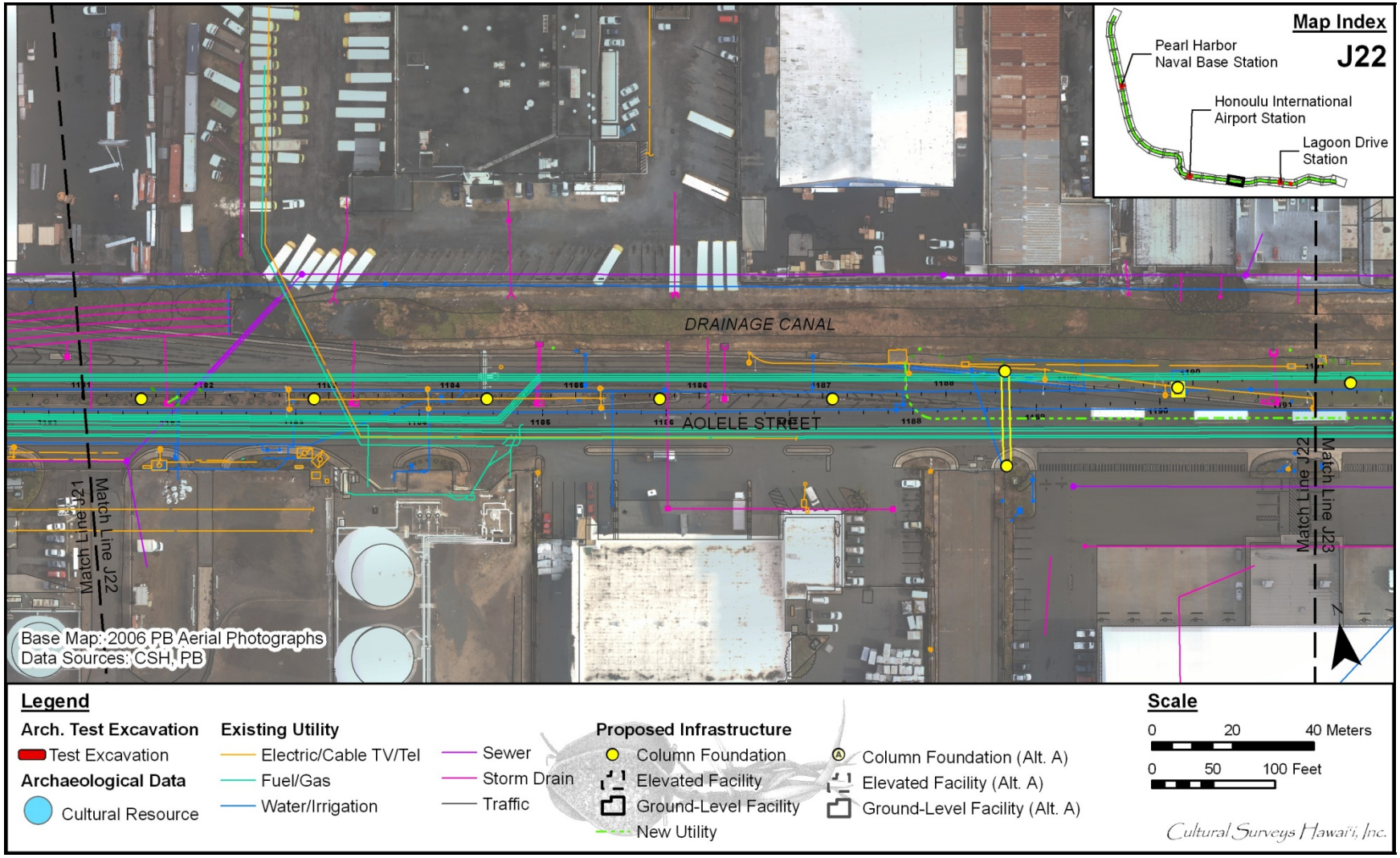


Figure 56. Map Sheet J22 showing the Airport Section 3 corridor along Aolele Street, west of the intersection with Aopoko Place (not labeled); note that no subsurface testing was conducted in this segment in accordance with the AISP (Hammatt and Shideler 2011)

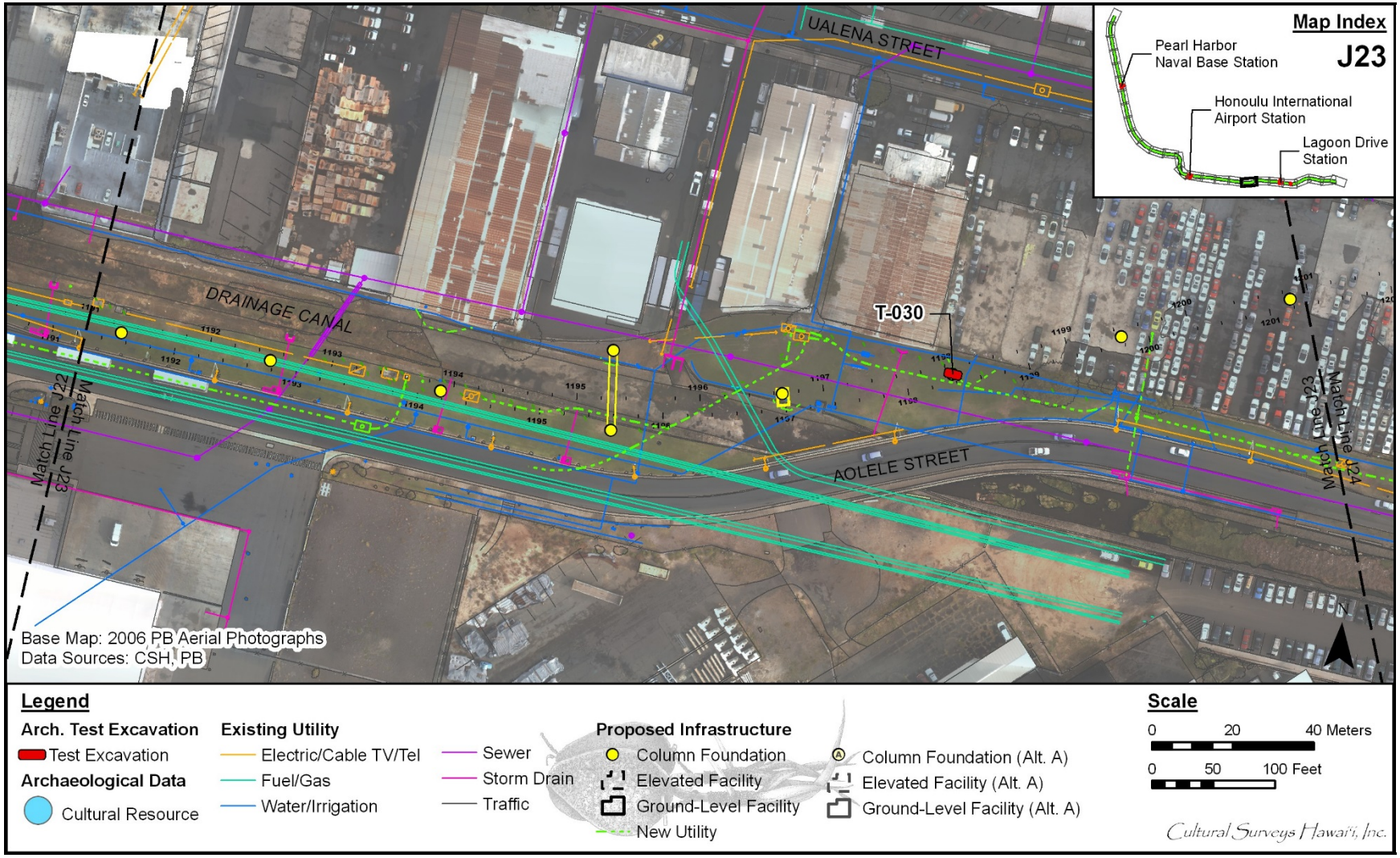


Figure 57. Map Sheet J23 showing the location of T-030 north of Aolele Street

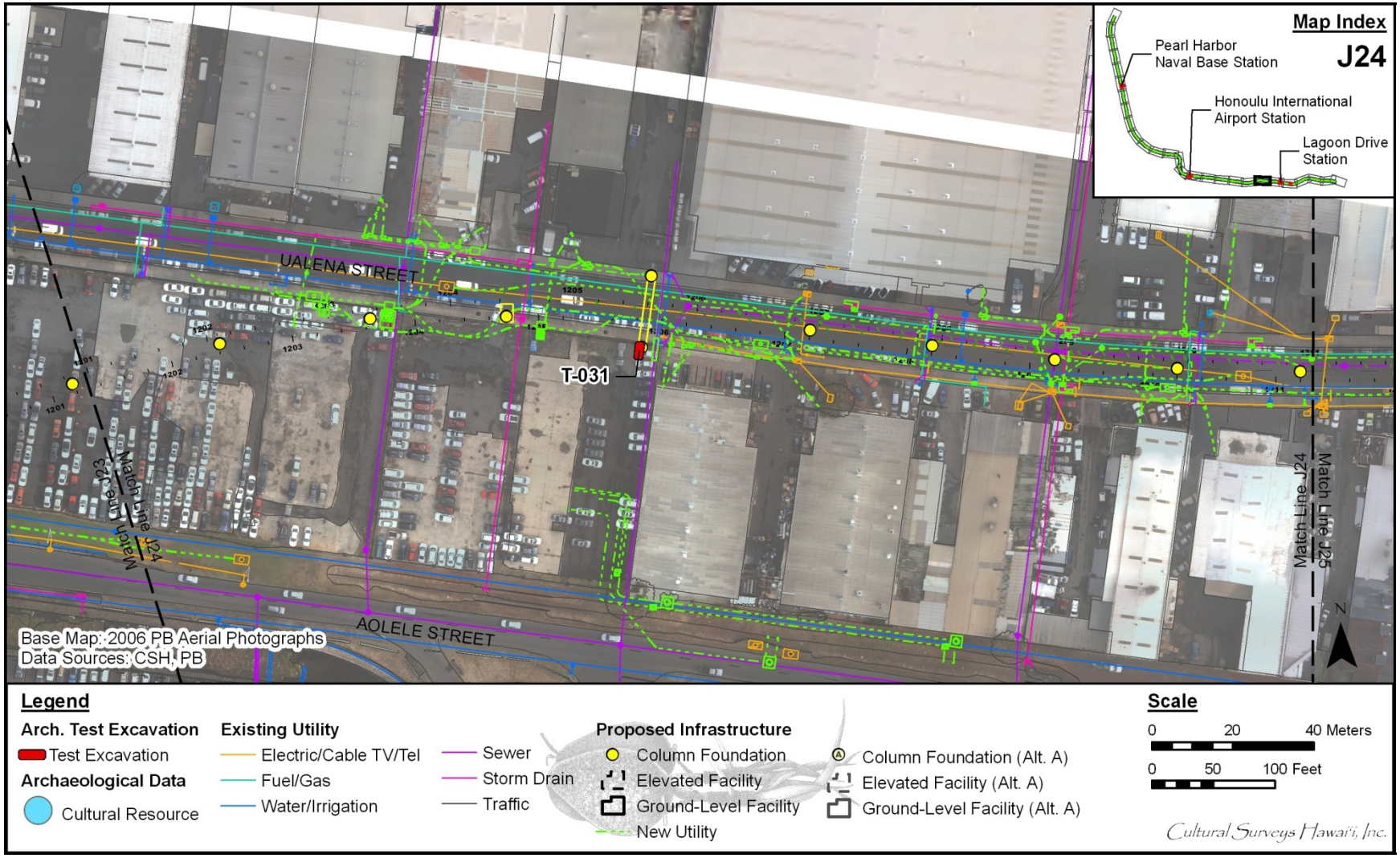


Figure 58. Map Sheet J24 showing the location of T-031 on the south (*makai*) side of Ualena Street

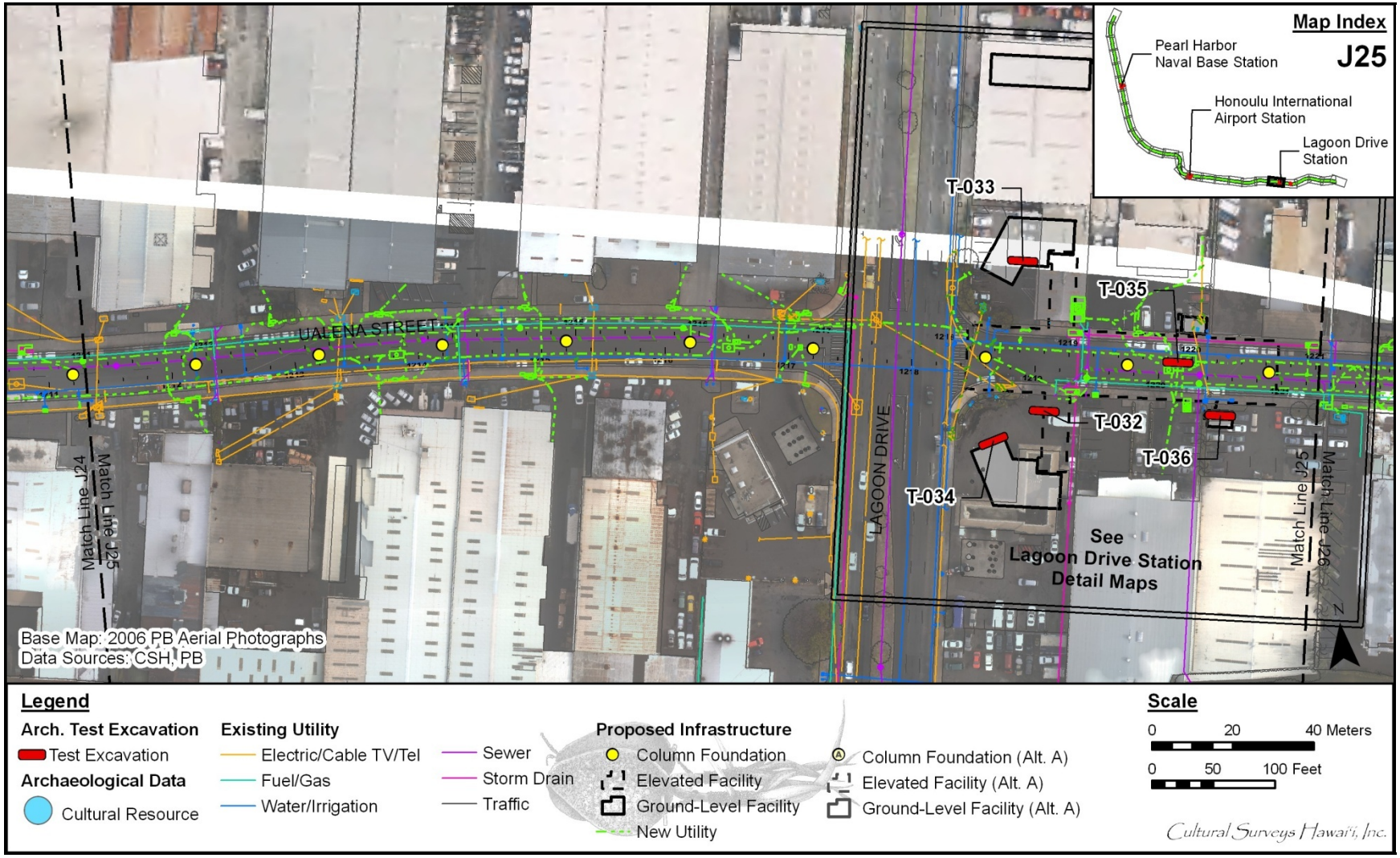


Figure 59. Map Sheet J25 showing the locations of T-032 through T-036 east (Diamond Head) of Lagoon Drive.

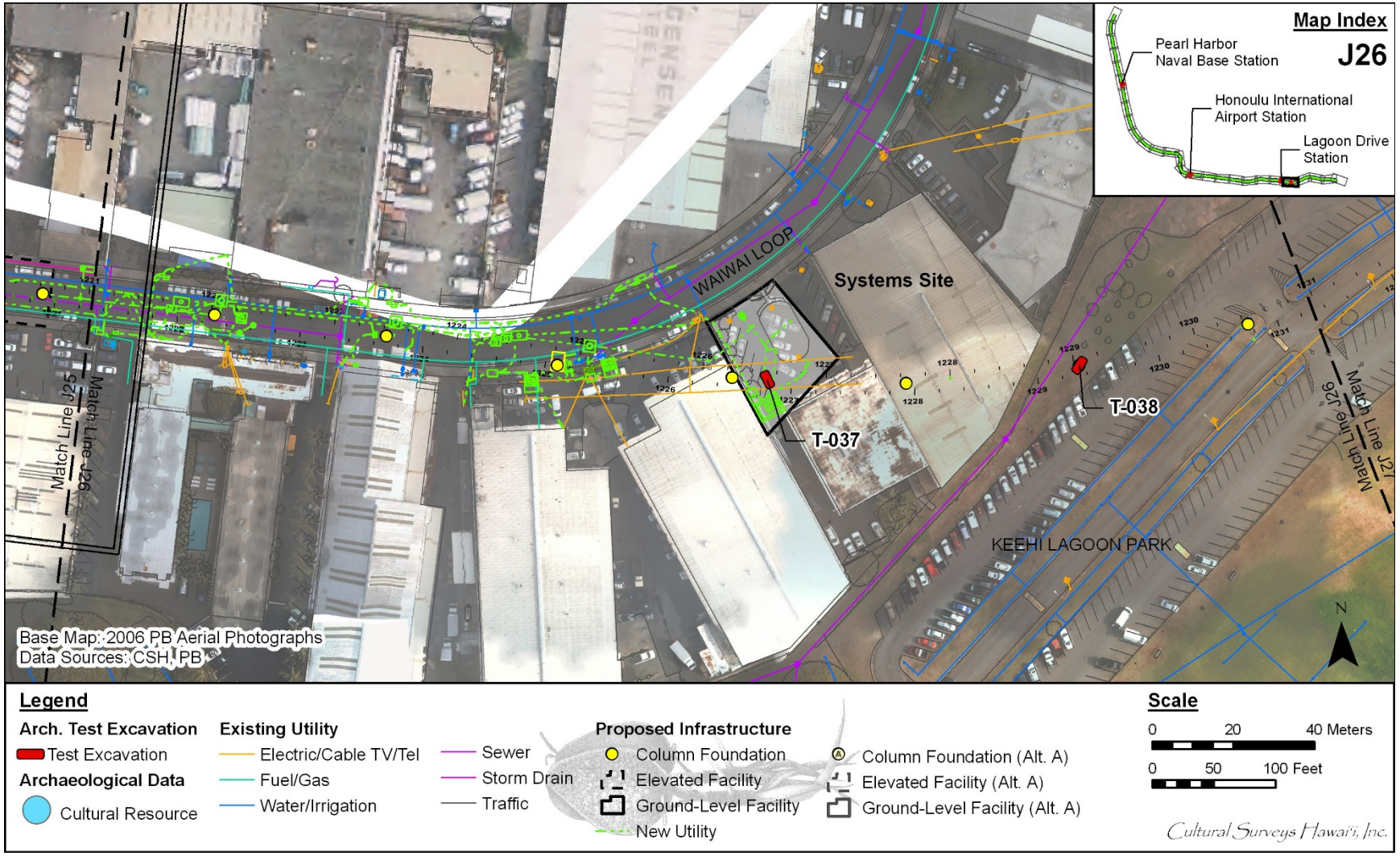


Figure 60. Map Sheet J26 showing the location of T-037 in the Systems Site Facility footprint southeast of Waiwai Loop and T-038 at Ke‘ehi Lagoon Park

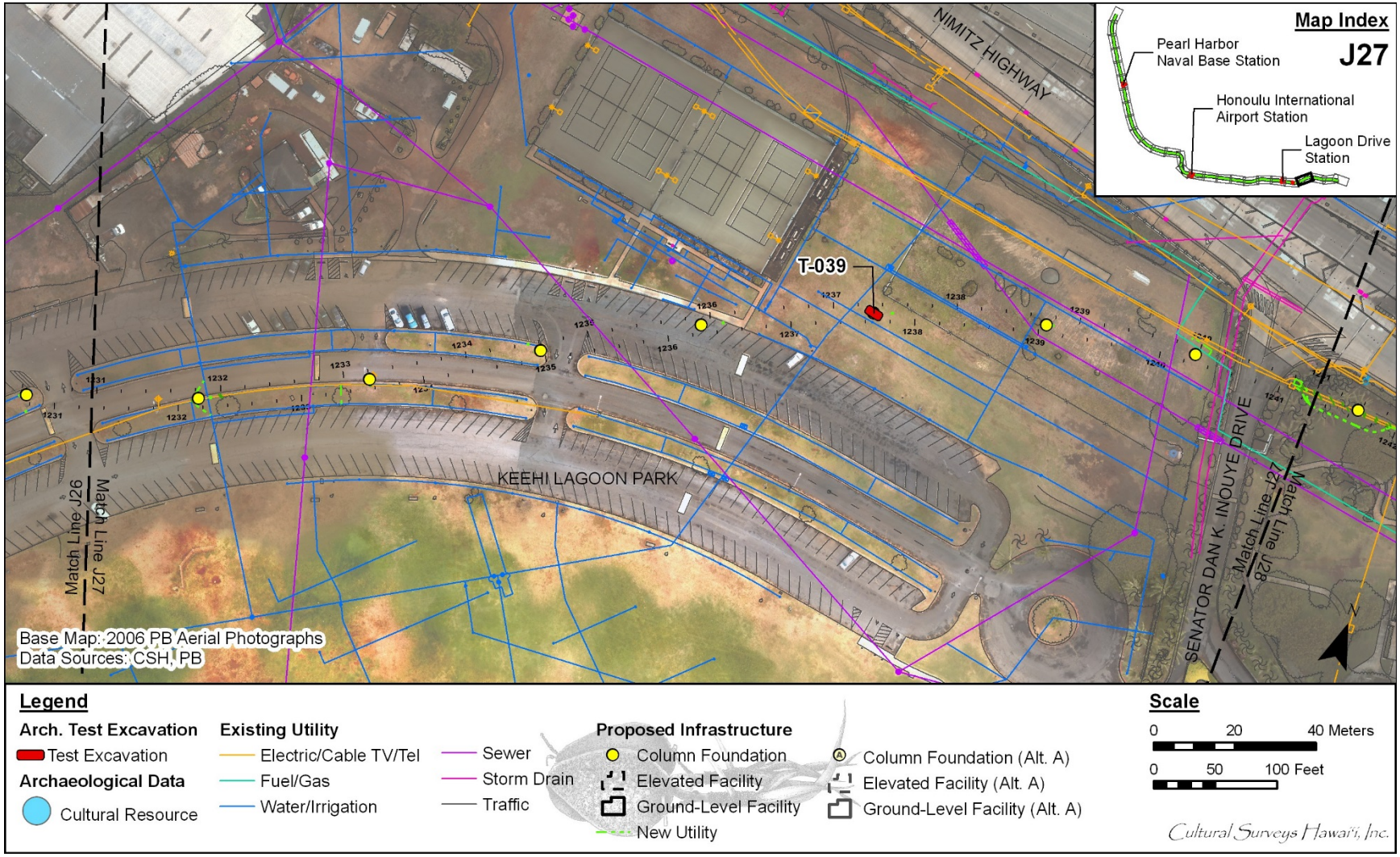


Figure 61. Map Sheet J27 showing the location of T-039 in Ke‘ehi Lagoon Park

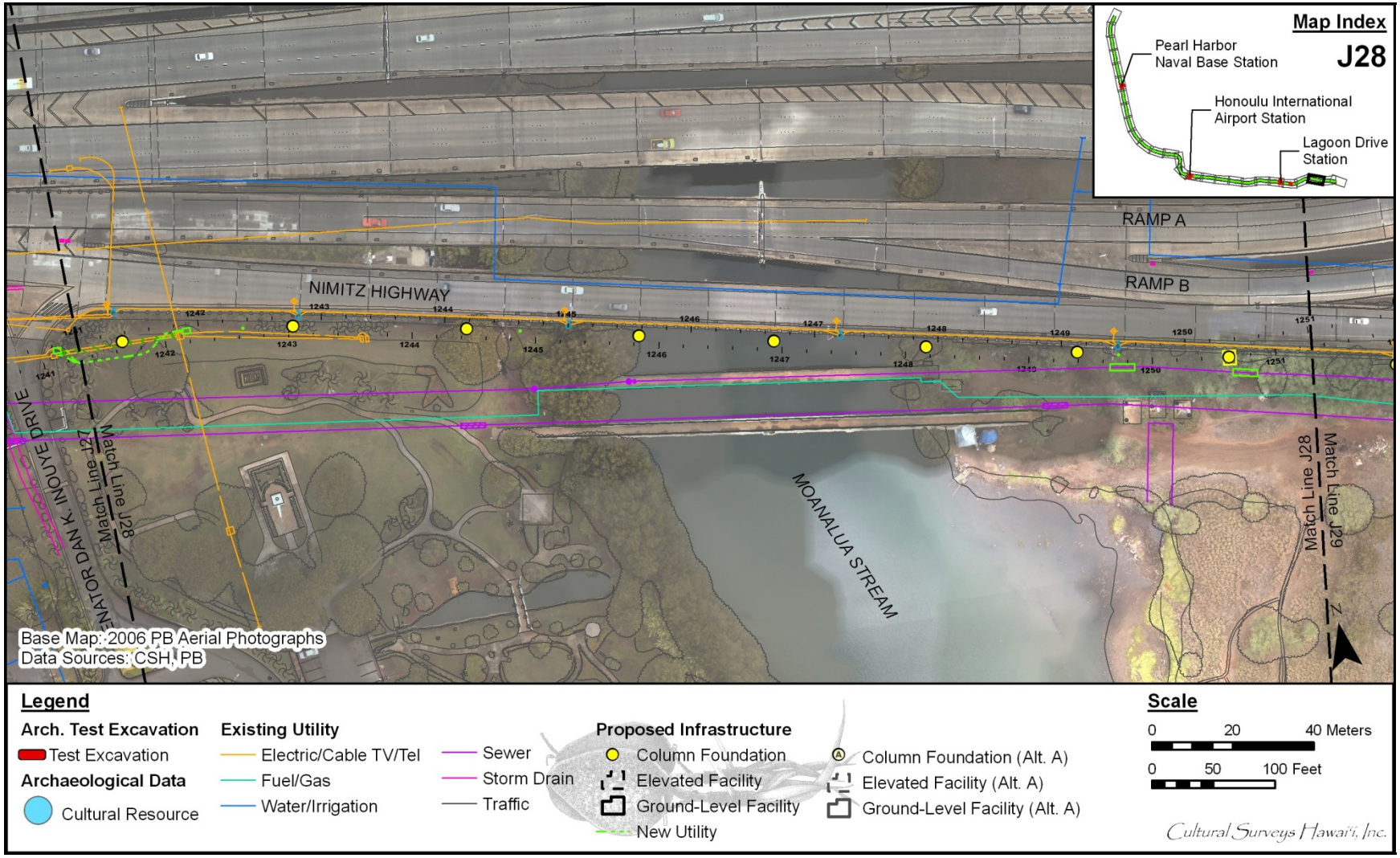


Figure 62. Map Sheet J28 showing the Airport Section 3 corridor along Nimitz Highway and crossing Moanalua Stream; note that no subsurface testing was conducted in this segment in accordance with the AISP (Hammatt and Shideler 2011)

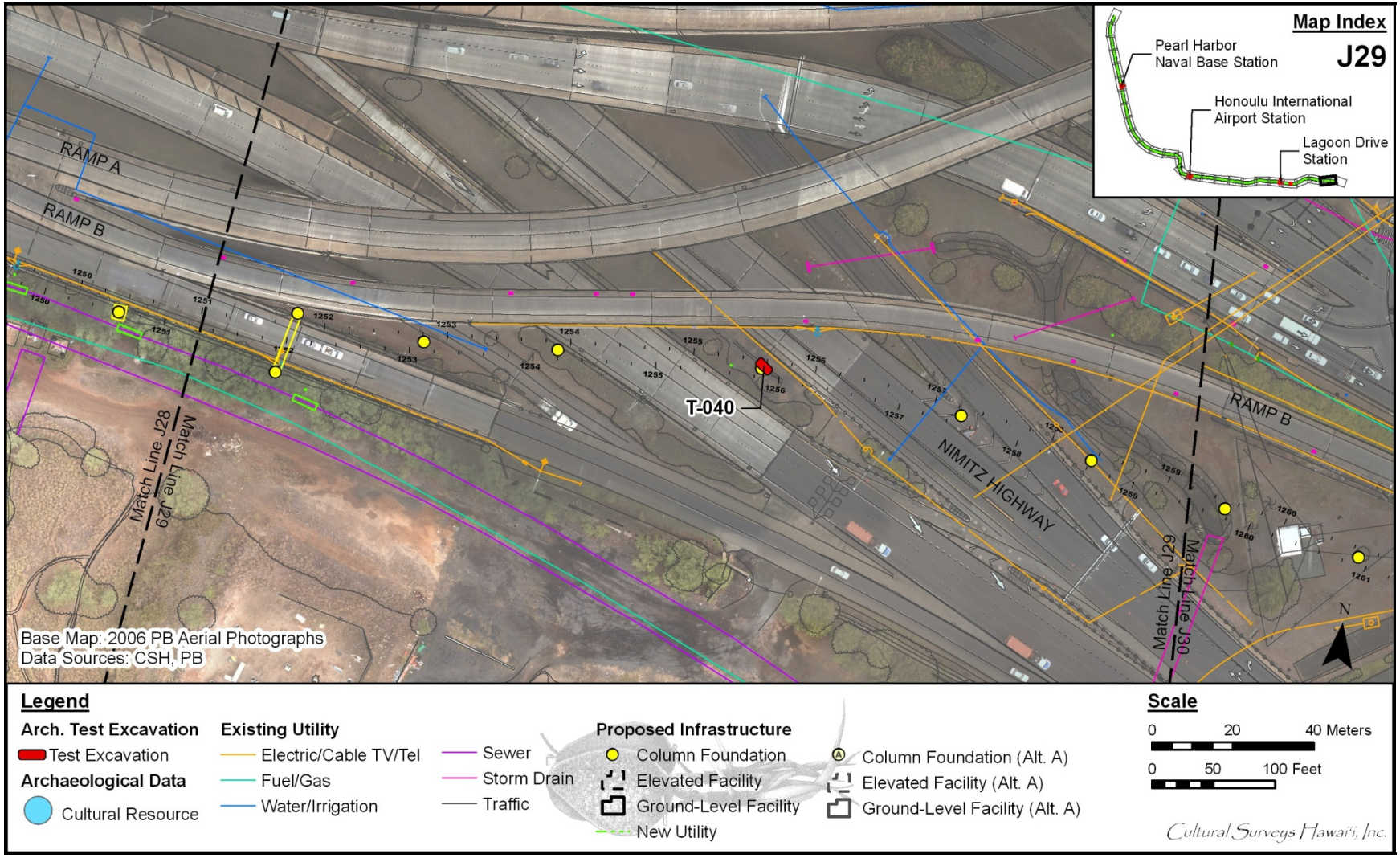


Figure 63. Map Sheet J29 showing the location of T-040 in the median between Nimitz Highway and Kamehameha Highway near the Middle Street interchange

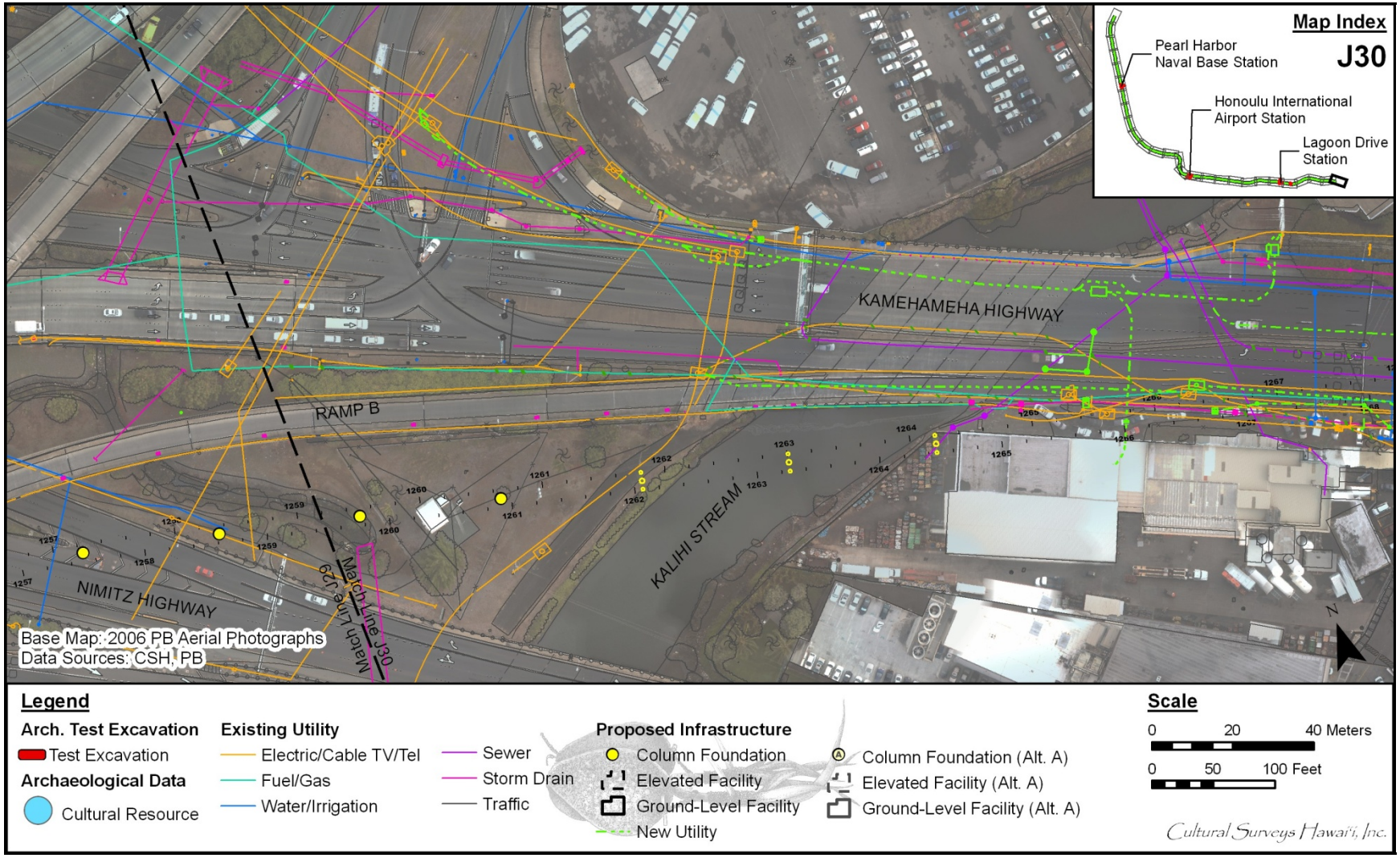


Figure 64. Map Sheet J30 showing the east end of the Airport Section 3 corridor at Kamehameha Highway; note that no subsurface testing was conducted in this segment in accordance with the AISP (Hammatt and Shideler 2011)

Figure 65. General view of T-001 (column foundation) vicinity at the intersection of Kamehameha Highway and Kalaloa Street/Arizona Memorial Place, view to northwest

Figure 66. General view of T-002 (column foundation) vicinity in landscaped area at right of guardrail on the north side of Hālawa Stream, view to southwest

Figure 67. General view of T-003 (column foundation) vicinity on the east side of Kamehameha Highway, south of Hālawa Drive, view to southwest

Figure 68. General view of T-004 (column foundation) vicinity in median of Kamehameha Highway, south of Hālawa Drive, view to south

Figure 69. General view of T-005 (column foundation) vicinity showing volcanic tuff ridges on on both sides of Kamehameha Highway at base of fences, view to south

Figure 70. General view of Rock land (rRK) on east side of Kamehameha Highway north of Radford Drive showing very thin overlying soil development, view to northeast

Figure 71. General view of Pearl Harbor Naval Base Station at the northeast corner of Kamehameha Highway (in background) and Radford Drive (at right), view to west

Figure 72. General view of Pearl Harbor Naval Base Station on the east side of Kamehameha Highway and just south of Radford Drive (arcing to the southeast in background), view to east

Figure 73. General view of Airport Section 3 corridor between T-013 (column foundation) in foreground and T-012 (column foundation) at H-1 East on-ramp, view to north

Figure 74. General view of Airport Section 3 corridor between T-013 (column foundation) and T-014 (column foundation) on west (*makai*) side of Makai Frontage Road, view to south

Figure 75. General view of T-015 (column foundation) location looking towards T-014 (column foundation) location, west of H-1 East and east of Makai Frontage Road, view to northeast

Figure 76. General view from T-015 (column foundation) location looking towards Honolulu Fire Department training facility on Nimitz Highway, view to southeast

Figure 77. General view of T-016 (column foundation) location southwest of H-1 East Freeway (at right), view to northwest

Figure 78. General view of Airport Section 3 corridor between T-017 (column foundation) location and T-018 (column foundation) location on *makai* (south) side of H-1 Freeway viaduct/Nimitz Highway (at left), view to east

Figure 79. General view of Airport Section 3 corridor looking towards T-020 (column foundation) location and Honolulu International Airport Terminal from intersection of Aolele Street and Nimitz Highway, view to south

Figure 80. General view of Airport Section 3 corridor approaching the Honolulu International Airport Station and Honolulu International Airport Station (Alternative A) at T-021 (column foundation) location in the grassy landscaping northeast of the tree, view to southwest

Figure 81. General view of Honolulu International Airport Station location, view to north

Figure 82. General view of Honolulu International Airport Station (Alternate A) location, view to south

Figure 83. General view of Airport Section 3 corridor along Aolele Street (at right) near T-028 (in median near causeway) location, view to west

Figure 84. General view of Airport Section 3 corridor along Aolele Street (at left) looking towards T-030 (column foundation) location (beyond fenceline at right), view to west

Figure 85. General view of Airport Section 3 corridor between Ualena Street (at right) and T-030 (column foundation) location, view to west

Figure 86. General view of Airport Section 3 corridor along Ualena Street (at left) looking towards the intersection of Ualena Street and Lagoon Drive, view to east

Figure 87. General view of Lagoon Drive Station location at the intersection of Lagoon Drive and Waiwai Loop, view to east

Figure 88. General view of Lagoon Drive Station location at the intersection of Lagoon Drive and Waiwai Loop, view to west

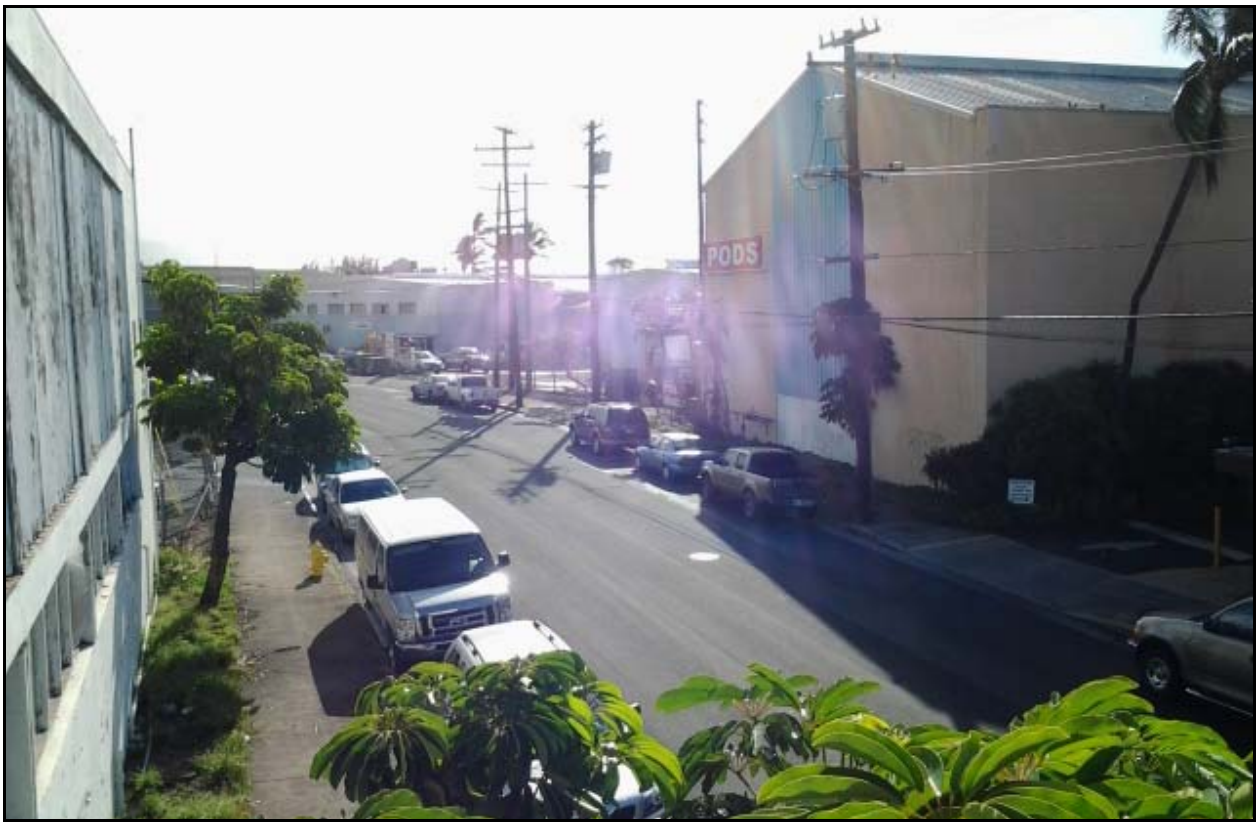


Figure 89. General view of Airport Section 3 corridor between Lagoon Drive Station and T-037 (column foundation) along Waiwai Loop, view to east

Figure 90. General view of Airport Section 3 corridor between T-038 (column foundation) and T-037 (column foundation), view to west

Figure 91. General view of Airport Section 3 corridor between T-038 (column foundation) and T-039 (column foundation), view to northeast

Figure 92. General view of Airport Section 3 corridor between T-039 (column foundation) and T-040 (column foundation), view to northeast

Figure 93. General view of T-040 (column foundation) location (off to left) along Airport Section 3 corridor, view to west

From this station, the project corridor continues east along Aolele Street (Figure 83 and Figure 84). It then crosses *mauka* over a drainage canal, parking, and warehouse locations before continuing east on the *makai* side of Ualena Street (Figure 85 and Figure 86).

From the Lagoon Drive Station which will be located just east of Lagoon Drive (Figure 87 and Figure 88), the corridor continues east along (southern) Waiwai Loop, crossing over a light industrial area of warehouse buildings (Figure 89 and Figure 90) to Ke‘ehi Lagoon Park. The route traverses the north portion of Ke‘ehi Lagoon Park (Figure 91 and Figure 92), crossing Senator Dan K. Inouye Drive, where it meets Nimitz Highway, and then paralleling the *makai* side of Nimitz Highway and crossing Moanalua Stream. Between Moanalua Stream and Kalihi Stream the route threads over various ramps of Nimitz Highway (Figure 93), rejoining Kamehameha Highway at Kalihi Stream.

7.2 Test Excavation Results

Forty-seven test excavations (T-001 through T-047) were investigated in the Airport Section 3 project area. An overview of the geographic distribution of these test excavations is provided in Figure 36 and Figure 37. A detailed discussion of each test excavation follows including reference to a location map, photographs of the excavation location and stratigraphy, an illustrated profile, a tabulated description of the stratigraphy, and a descriptive summary of the excavation conditions and results. Test excavation locations are cross-referenced to historic maps with an overlay depicting the approximate excavation location (Figure 94 through Figure 107).

The stratigraphic sequences are described following USDA soil description terminology (Natural Resources Conservation Service/USDA 2002). Observations included color, texture, structure, consistency, plasticity, cementation (if appropriate), sediment origin (marine or terrigenous), inclusions such as cultural materials and/or roots, lower boundary distinctiveness and topography, and other general observations. The use of these standardized descriptive observations allowed for stratigraphic comparisons among nearby excavation areas. They also facilitated comparison with other data to develop the historic context of each test excavation (T-001 through T-047), including information about general setting, geomorphology, depositional history, past land use, and identification of subsurface archaeological historic properties (sites, features, and deposits) within individual excavations and across the Airport Section 3 project area.

The entire Airport Section 3 study area has been extensively developed and is characterized by streets, sidewalks, parking areas, buildings, and landscaped areas. There are multiple historic (pre-1960) and modern deposits characterized by asphalt, base course fill, reworked fill, introduced fill, or locally-procured fill. Within this portion of the project corridor, these fill generally relate to reclamation projects and/or construction projects involving roads, utilities, or other infrastructure. An important aspect of documenting the stratigraphic sequences within the corridor focuses on identifying the impacts (e.g., truncation) and the nature of the boundaries (e.g., smooth and distinct) between these fill episodes and any underlying natural strata (e.g., wetland sediments) or cultural *strata* (e.g., former A-horizons) associated with pre- and/or early post-Contact land use.

The strata within the Airport Section 3 study area include the following:

- Natural: sediment deposited by natural processes (e.g., coral bedrock, beach sand).
- Cultural: sediment deposited by various processes that includes cultural materials (e.g., artifacts) or evidence of cultural activities (e.g., features, living surface). Most commonly these deposits are identified as buried A-horizons with evidence of features and/or artifacts.
- Reworked Fill: sediment consisting primarily of local parent material of limited human spatial transport often characterized by an admixture of historic or modern construction debris with previously-deposited natural and/or cultural sediments.
- Introduced Fill: sediment consisting primarily of parent material transported by humans from another location which is distinct from locally-available sediments. These fills may include dredged material, terrestrial material, and/or some admixture of historic and/or modern debris.
- Locally-Procured Fill: sediment consisting of local parent material, but often involving a broader area of human transport than Reworked Fill.
- Top Soil Fill: sediment of higher organic content imported by humans to support historic or modern landscaping (often loams).
- Base Course: sediment consisting of homogenous material such as crushed coral or basalt gravel imported and compacted by humans to provide a support base for an overlying construction (e.g., building foundation or road).

Limitations and important documentation procedures (if applicable) for each test excavation are summarized in the “Documentation Limitations” section of the test excavation summaries. Where possible, excavation was carried out to 3 m below surface (mbs), the maximum possible due to safety concerns, the available shoring system, and the limits of the mechanical excavator’s reach. Of course, reaching bedrock before this depth halted excavation at shallower depths. Sometimes there were utilities in the excavation sidewalls, or loose fill, often with boulders, that made excavation sidewalls unstable and unshoreable. In these instances, safety concerns often limited depth of excavation and trench recording procedures—for example, if shoring could not be used because of loose, unstable excavation sidewalls, then archaeologists could not enter the excavations to take samples and draw stratigraphy. In these instances, documentation proceeded in the best, most thorough manner available given the limitations—in consultation with the on-site safety consultant.

In some test excavations, concrete slabs, concrete utility jackets containing live utilities, or other paving layers were encountered. On-site safety was a primary consideration and the archaeologists complied with the on-site safety consultant’s decisions regarding whether excavation could safely extend and/or continue through such paving layers. As such, some test excavaton were halted due to these safety hazards.

Ground Penetrating Radar (GPR) survey was a substantial part of the AIS fieldwork effort (see AISP [Hammatt and Shideler 2011] and Appendix C). Appendix E summarizes the GPR study conducted as part of the Airport Section 3 AIS. The following excavation descriptions provide brief summaries of the GPR results for each location.

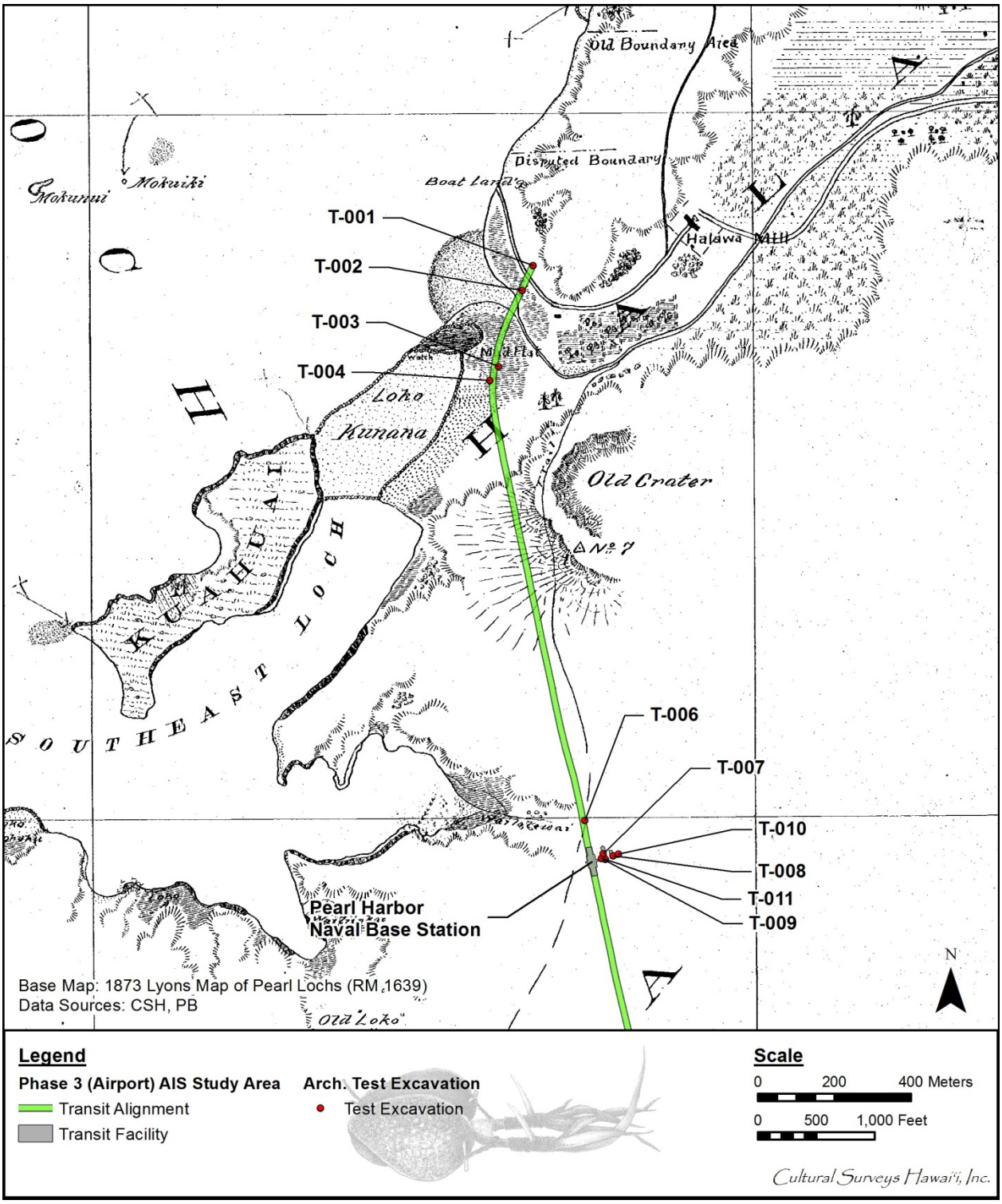


Figure 94. Overlay of Airport Section 3 test excavations (approximate location) on 1873 Lyons map of Pearl Lochs (Note: a trail is shown crossing the project corridor near the Pearl Harbor Naval Base Station at a crossing swale that appears to show a small water course flowing into the small Wailolowai Fishpond)

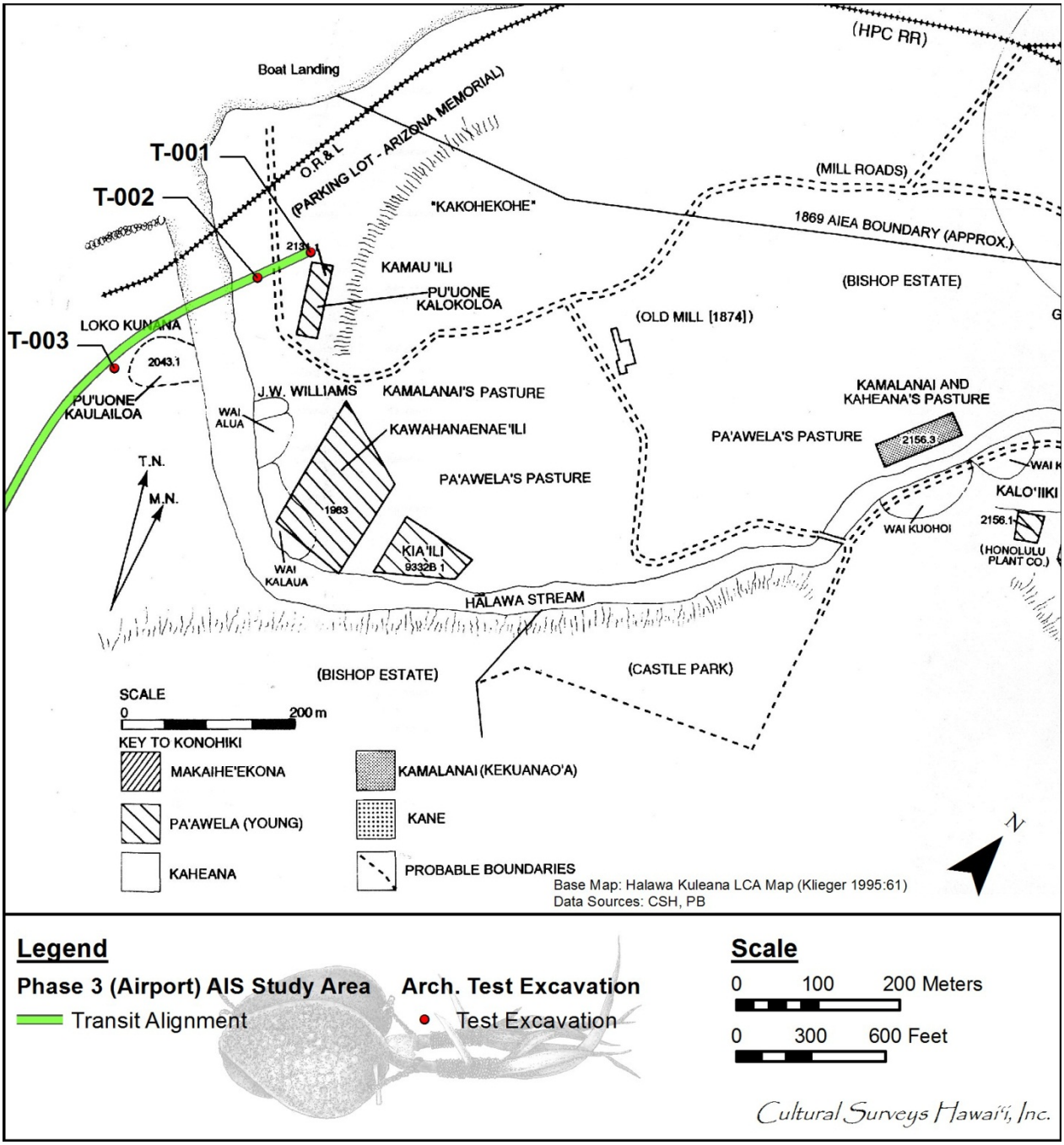


Figure 95. *Kuleana* Land Commission Awards along lower Hālawa Stream (adapted from Klieger 1995:61) including locations of Pu‘uone Kalokoloa Fishpond (LCA 2131) near the north end of the Airport Section 3 corridor showing approximate locations of test excavations (Note: LCA shapes were often simplified into quadrilaterals during surveying)

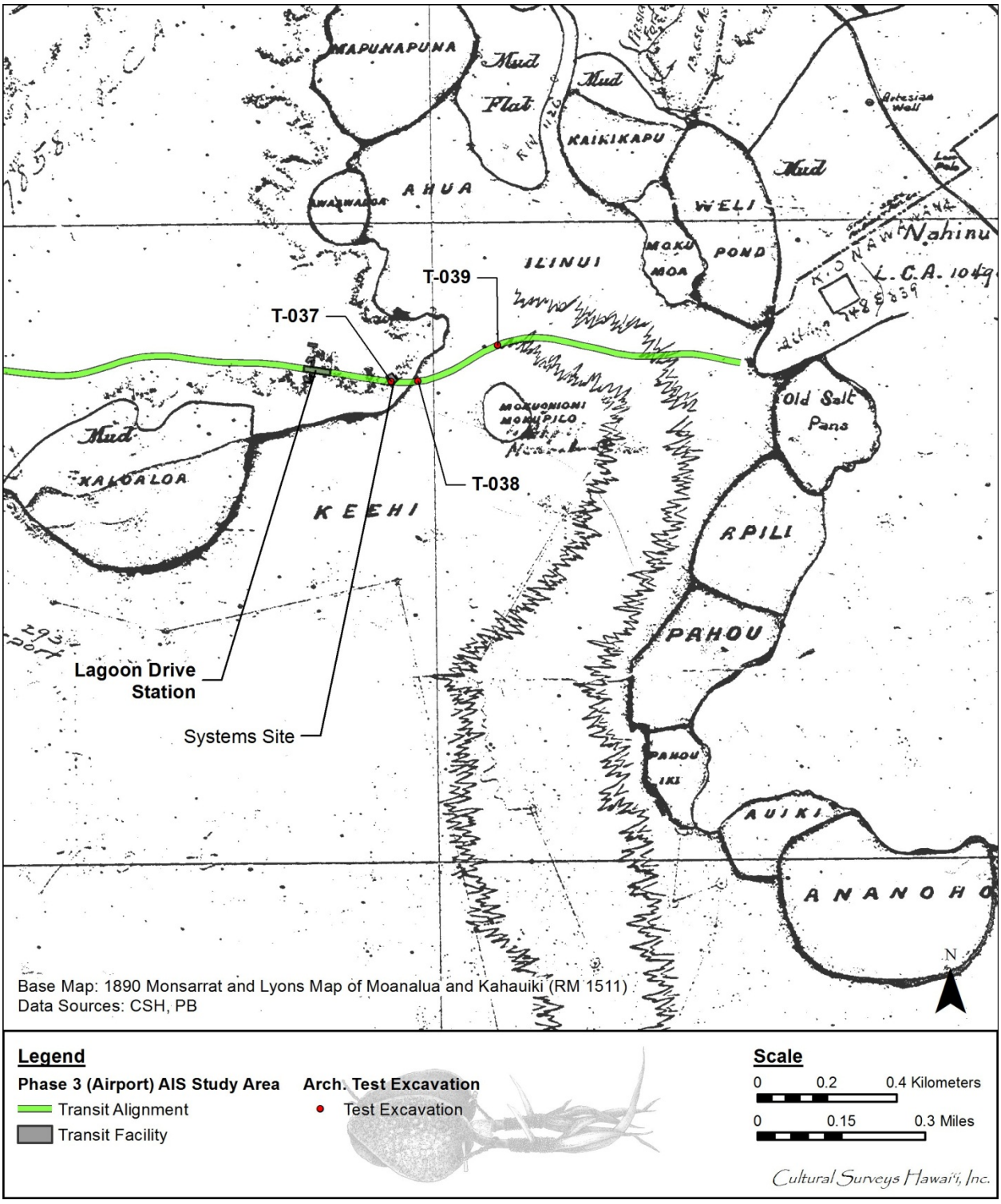


Figure 96. Overlay of Airport Section 3 test excavations on 1890 Monsarrat and Lyons Moanalua and Kahauiki map (RM 1511). Note the former open water east of the Lagoon Drive Station

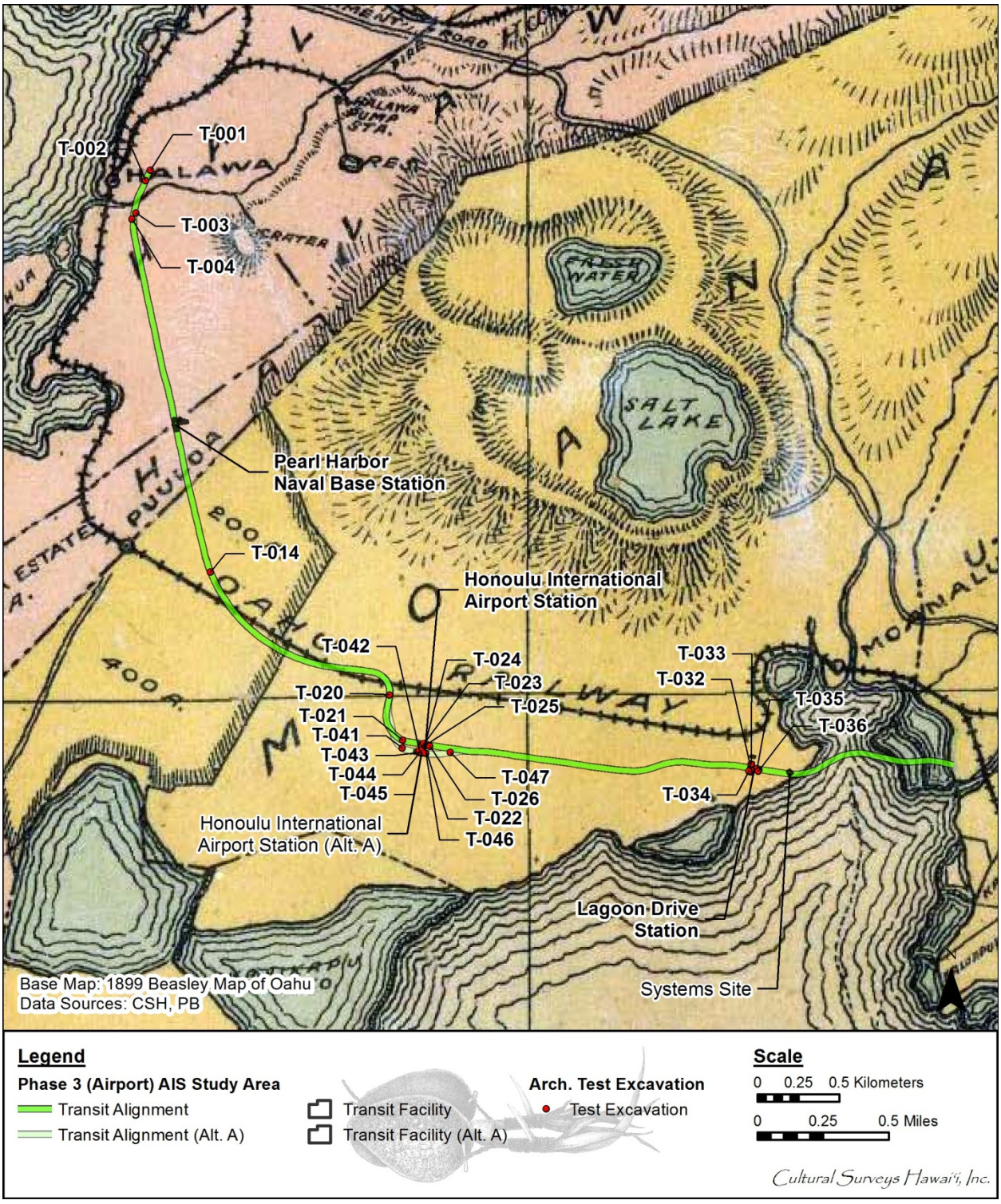


Figure 97. Overlay of the Airport Section 3 test excavations on a portion of the 1899 Beasley map of O‘ahu

Figure 98. Overlay of the Airport Section 3 test excavations on the 1906 Donn Map of Oahu (Note: extensive “Approximate Area of Sugar Plantations” and two “Approximate Areas of Wetlands” along project corridor

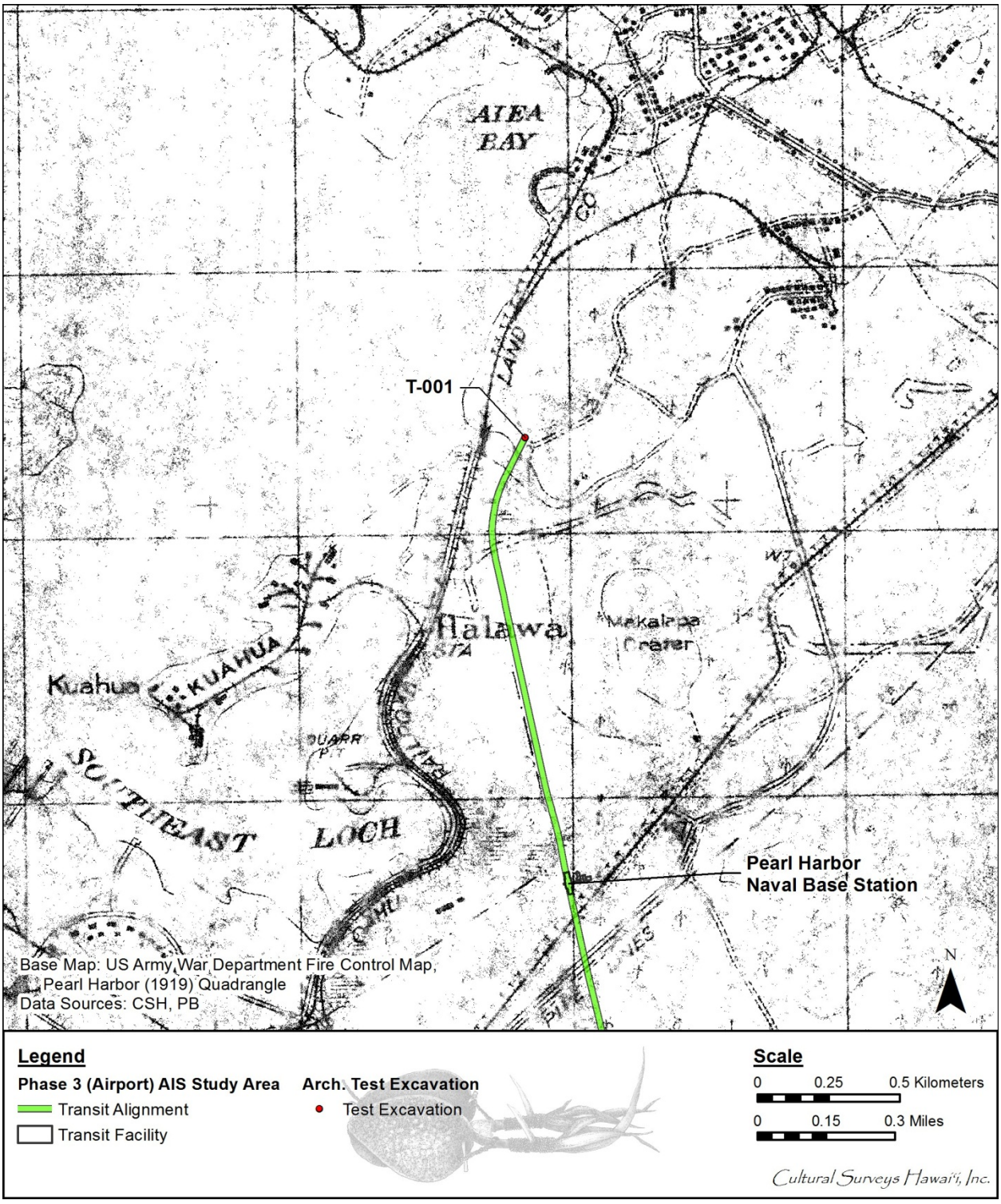


Figure 99. Overlay of Airport Section 3 test excavations (approximate location) on 1919 U.S. Army War Department Fire Control map of Pearl Harbor and Honolulu quadrangle maps

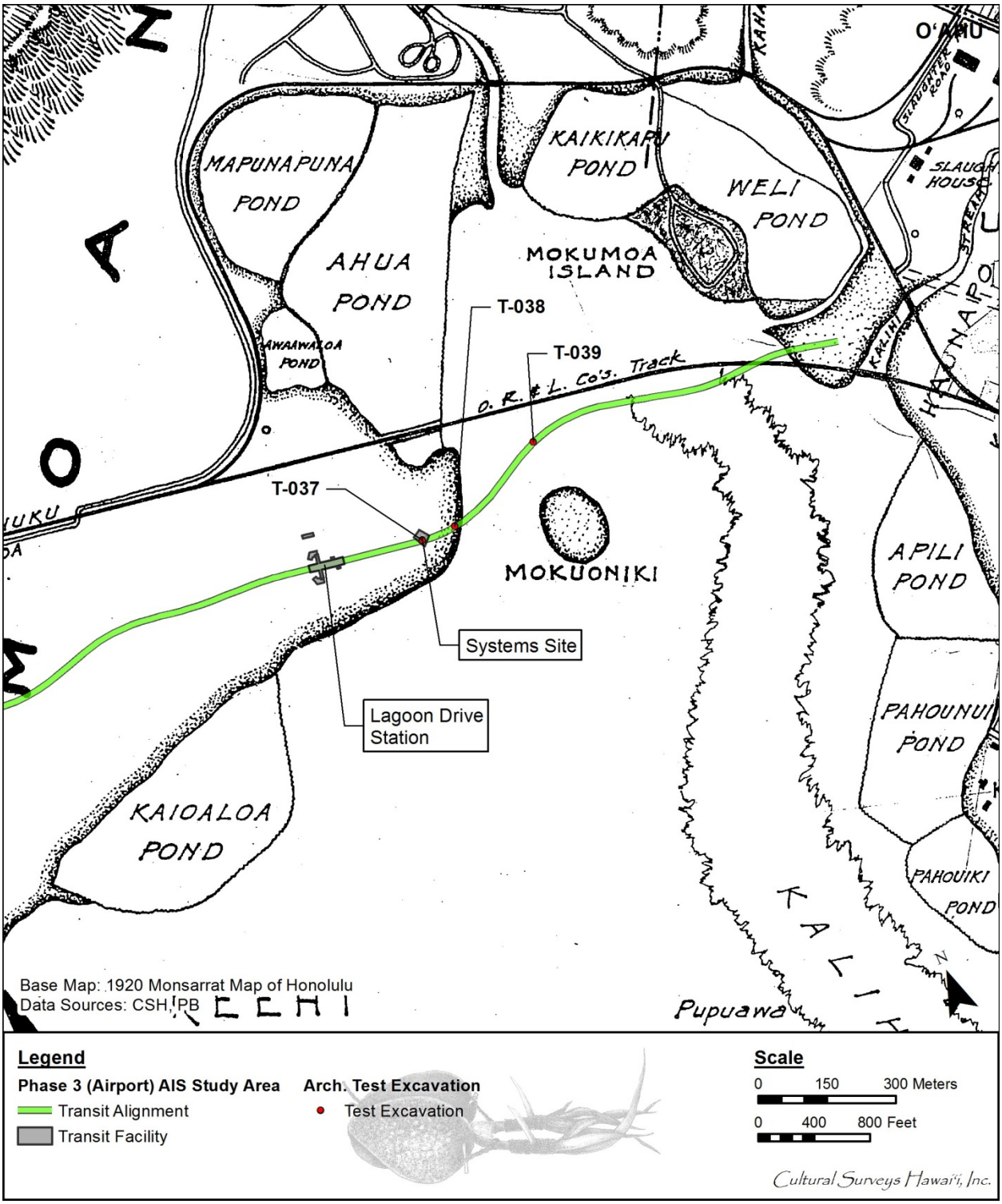


Figure 100. Overlay of the Airport Section 3 test excavations on 1920 Monsarrat Honolulu District Map. Note the former open water east of the Lagoon Drive Station

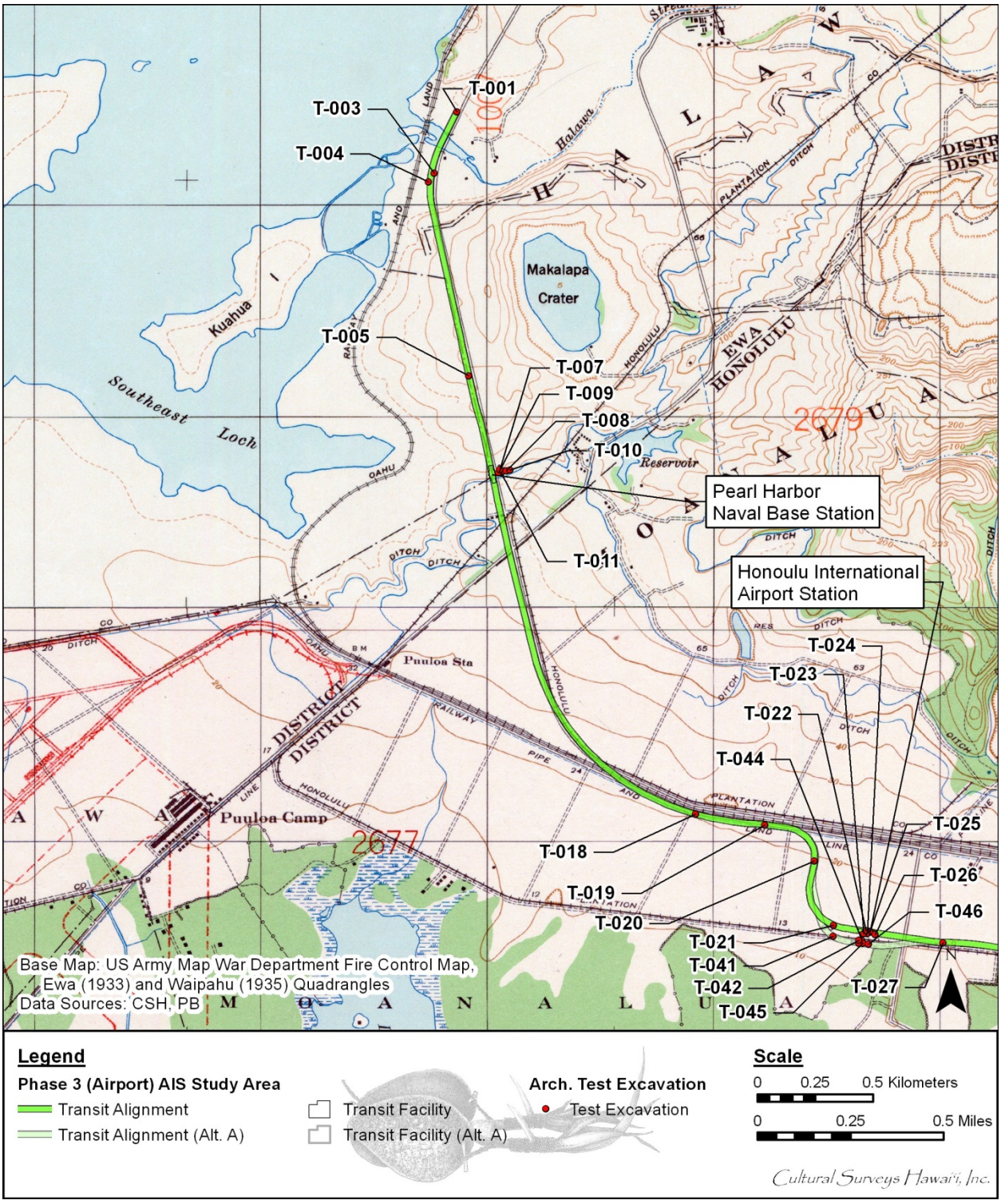


Figure 101. Overlay of west portion of Airport Section 3 test excavations (approximate location) on 1933 U.S. Army War Department Fire Control map

Figure 102. Overlay of east portion of Airport Section 3 test excavations (approximate location) on 1933 U.S. Army War Department Fire Control map

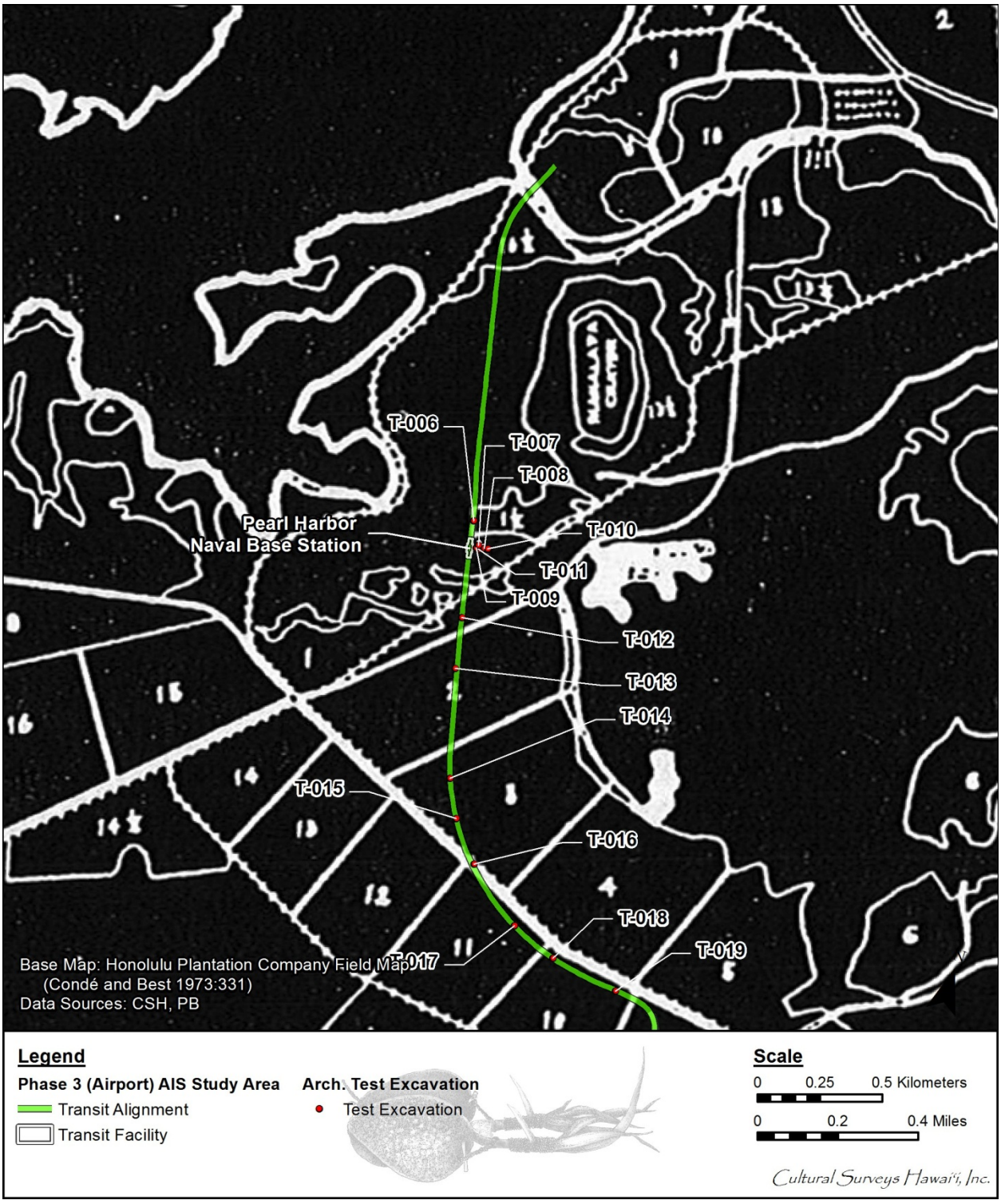


Figure 103. Overlay of the west portion of Airport Section 3 study area on circa 1935 Honolulu Plantation Field map (Conde and Best 1973:331)

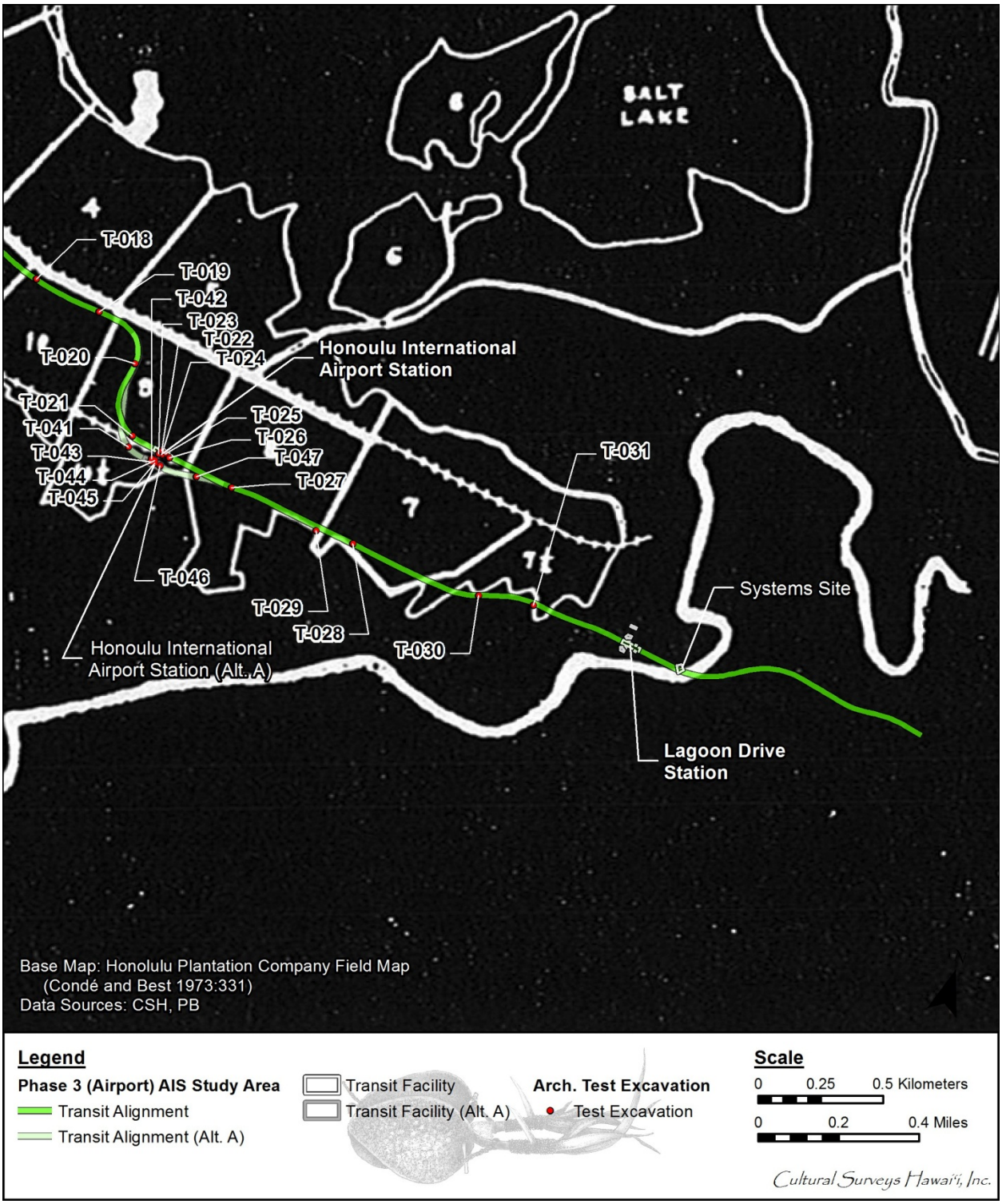


Figure 104. Overlay of the east portion of Airport Section 3 study area on circa 1935 Honolulu Plantation Field map (Conde and Best 1973:331)

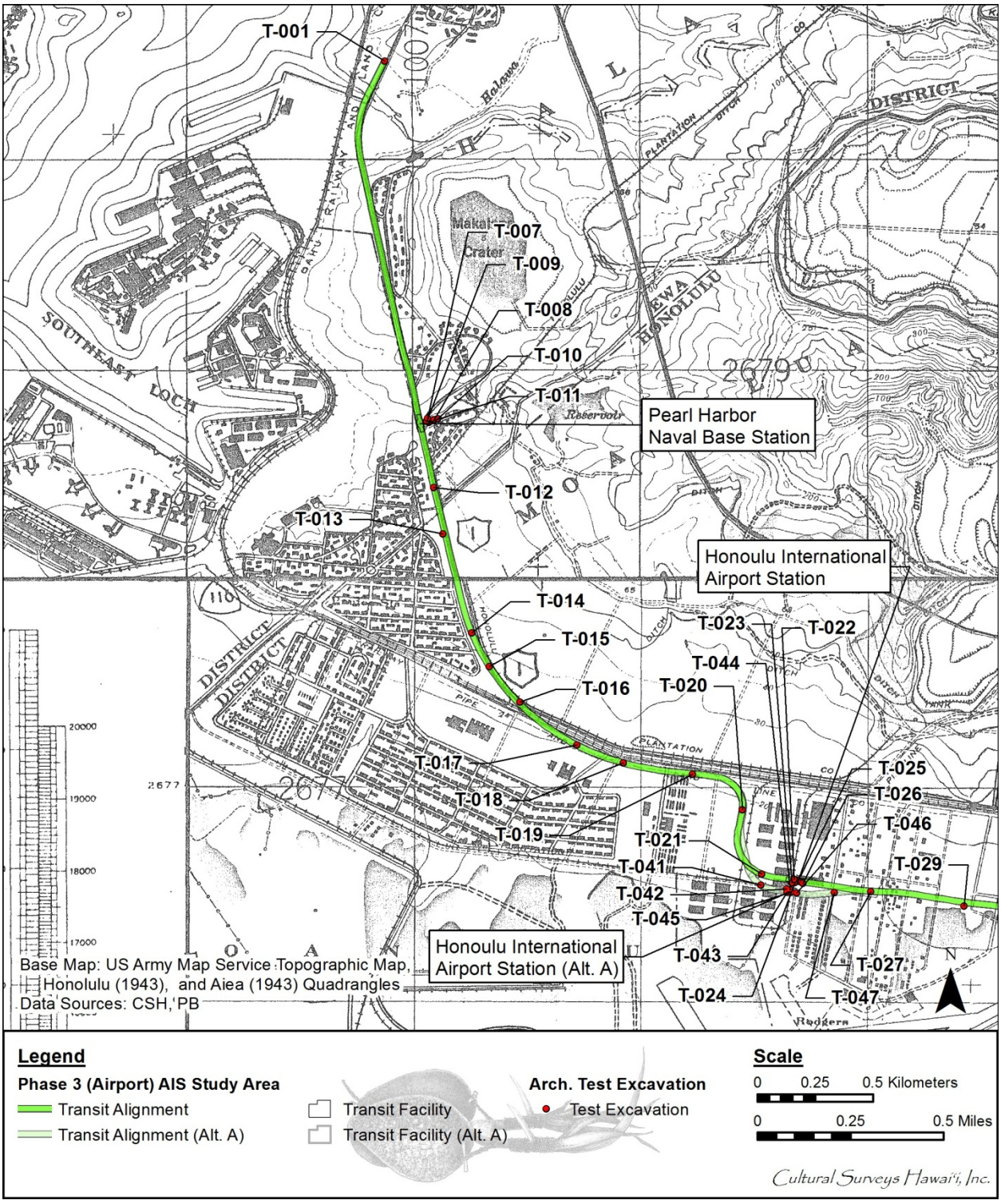


Figure 105. Overlay of the west portion of Airport Section 3 study area on 1943 U.S. Army War Department Terrain map of the Aiea quadrangle

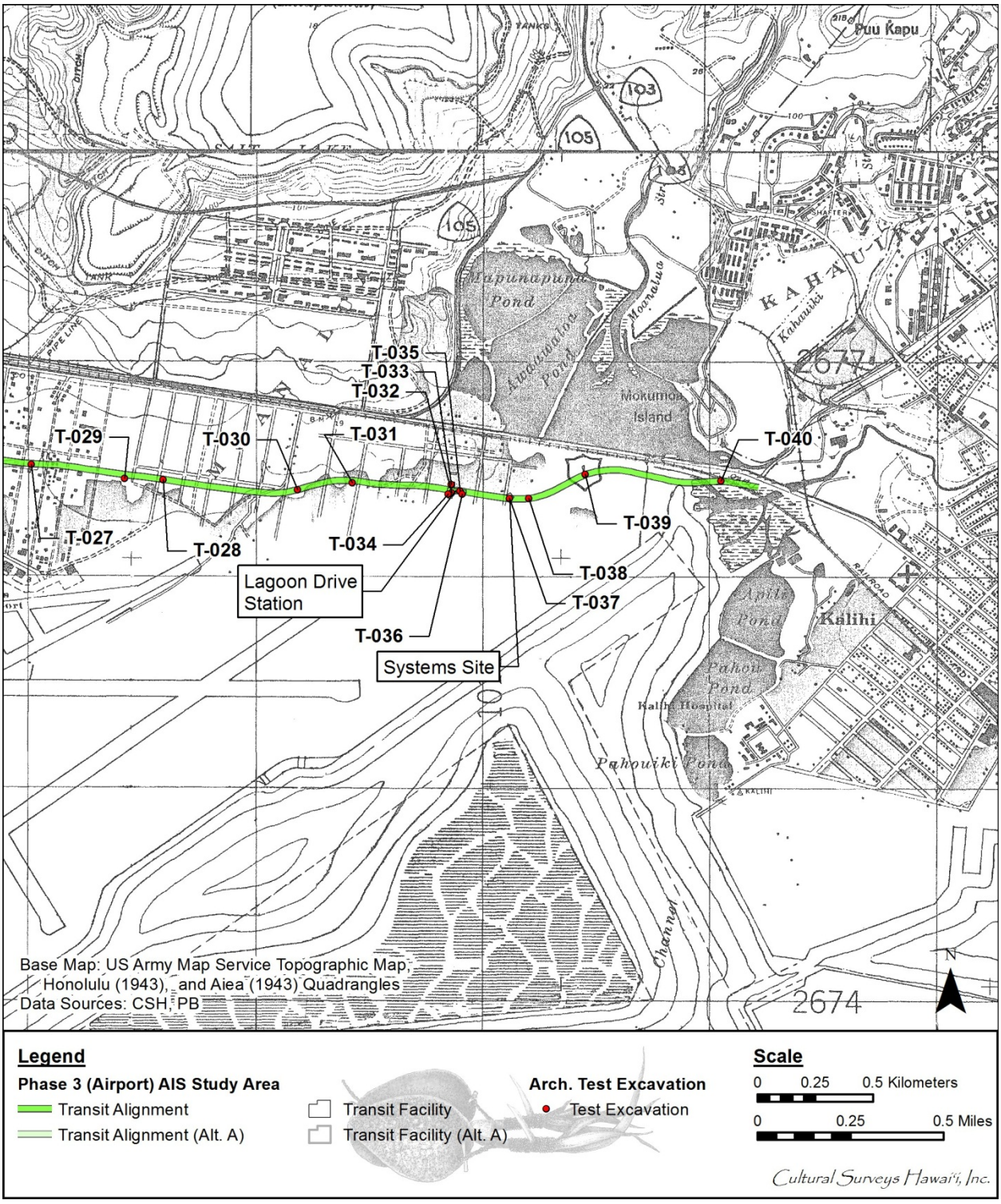


Figure 106. Overlay of the east portion of Airport Section 3 study area on 1943 U.S. Army War Department Terrain map of the Aiea quadrangle

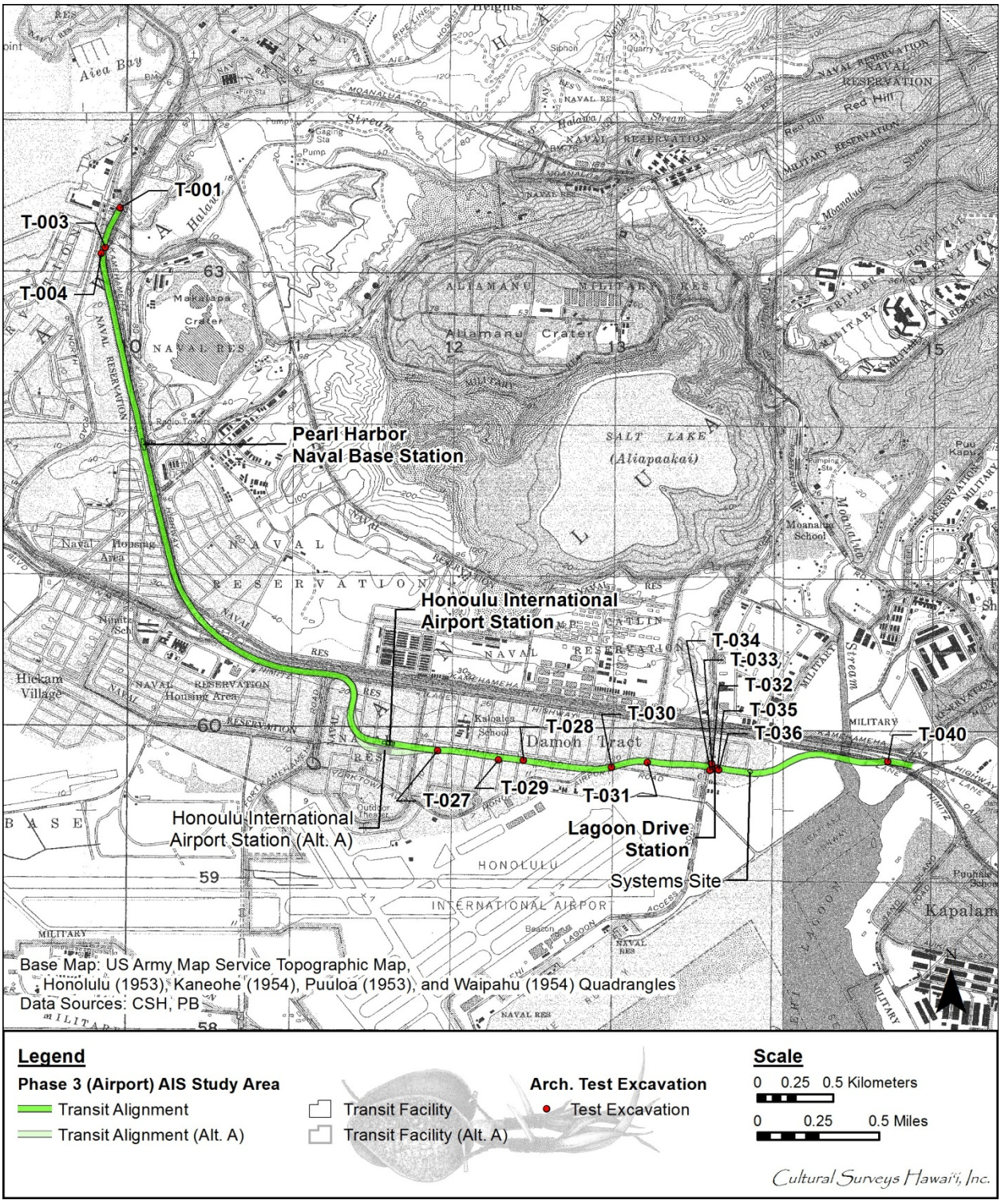


Figure 107. Overlay of Airport Section 3 study area on 1953 US Army Mapping Service Topographic map of Aiea quadrangle Honolulu (1953), Kāne‘ohe (1954), Puuloa (1953) and Waipahu (1954) quadrangles, showing study area

7.2.1 Test Excavation 1 (T-001)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-003:066
Street:	Kamehameha Highway
Owner:	Harry B. Kronick Trust
Elevation:	5.31 m
UTM:	610237.5624 mE, 2363044.565 mN
Max Length/Width/Depth:	3.10 m/1.10 m/2.95 m
Orientation:	$1^{o}/181^{o}$ TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 1 (T-001) was located in a traffic island on Kamehameha Highway at the intersection with Kalaloa Street and Arizona Memorial Place, prior to the entrance to the Pearl Harbor Visitor Center (see Figure 38; Figure 108). The elevation is significantly higher than at the Pearl Harbor Visitors Center (about 3.0 m) to the west and lower than the adjoining residential area to the northeast.

Summary of Background Research and Land Use: The 1873 Lyons Pearl Lochs map indicates a road 22.5 m southwest of T-001 stretched from Halawa Mill (400 m to the east) to a boat landing at the former shoreline, about 225 m to the northwest (see Figure 94). A reconstruction of the lower Hālawa Stream cultural landscape (Klieger 1995:61) indicates the Pu‘uone Kalokoloa Fishpond was located immediately east of T-001 and that most of the fields and habitations were further up Hālawa Stream (see Figure 95). The Loko Kunana Fishpond was located on the opposite (south) side of the mouth of Hālawa Stream. The “Mill Roads” indicated in historic maps between 1873 and 1897 is consistent with the current location of Kalaloa Street. An 1899 Beasley map shows the OR&L and an associated Hālawa Station about 103 m northwest of T-001 (see Figure 97). A 1919 U.S. Army War Department Fire Control map shows the same road and railroad alignments (see Figure 99). A 1933 War Department map also shows the same OR&L alignment but not the Mill road (see Figure 101). A 1943 War Department map shows a subdivision 250 m northeast of T-001 (see Figure 105). According to a 1953 map of Puuloa by the Army Map Service, the Naval Reservation was established southwest of T-001 (see Figure 107).

T-001 was located in close proximity to the previously placed P-38 series of pole locations (poles P38, P38A, P38b and P38c) monitored by Archaeological Consultants of Hawai‘i, Inc. (Avery et al. 1994). This study documented multiple historic fill deposits down to sea level near the mouth of Hālawa Stream. The International Archaeological Research Institute, Inc. (Dye 1999) conducted an archaeological survey for a Hālawa Bridge replacement project which revealed that “20th century landscape modifications, including the presence of large quantities of

fill material along the banks of [Hālawa] stream, several subterranean drainage pipes, and a concrete channel lining, have likely destroyed historic sites" (Dye 1999:4).

Documentation Limitations: T-001 was excavated to a maximum depth of 2.95 mbs. The base of excavation was limited by the maximum reach of the backhoe and safety protocols.

Stratigraphic Summary: The stratigraphy of T-001 consisted of fill strata to the base of excavation (Figure 109 and Figure 110). Observed strata were asphalt (Stratum Ia), basalt gravel base course (Stratum Ib), crushed coral fill (Stratum Ic), extremely gravelly silt fill (Stratum Id), gravelly clay loam fill (Stratum Ie), very cobbly loam fill (Stratum If), and gravelly clay loam fill (Stratum Ig). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains were observed. A single *Chama iostoma* (rock oyster) shell was recovered from Stratum Ig (see Section 8.2).

Lab Results: No additional laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-001 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.15 mbs and again around 0.50 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.0 mbs (see Appendix E for more details).

Summary: T-001 was excavated to a maximum depth of 2.95 mbs. The base of excavation was limited by the maximum reach of the backhoe and safety protocols. Stratigraphy present within T-001 consisted entirely of fill deposits (Strata Ia-Ig) and conformed to the USDA soil survey designation of Fill land (FL). A single *Chama iostoma* (rock oyster) shell was recovered from Stratum Ig. No cultural resources were identified.

Historic evidence indicates substantial traditional Hawaiian activity in the vicinity of the mouth of Hālawa Stream. However, the thick fill deposits recorded in T-001 and in two earlier studies (Avery et al. 1994 and Dye 1999) documented that no archaeological evidence of this activity remains in this area.

Figure 108. Photograph of Airport Section 3, T-001, general location looking towards Hālawa Stream, view to south

Figure 109. Photograph of Airport Section 3, T-001, general view of profile, view to east

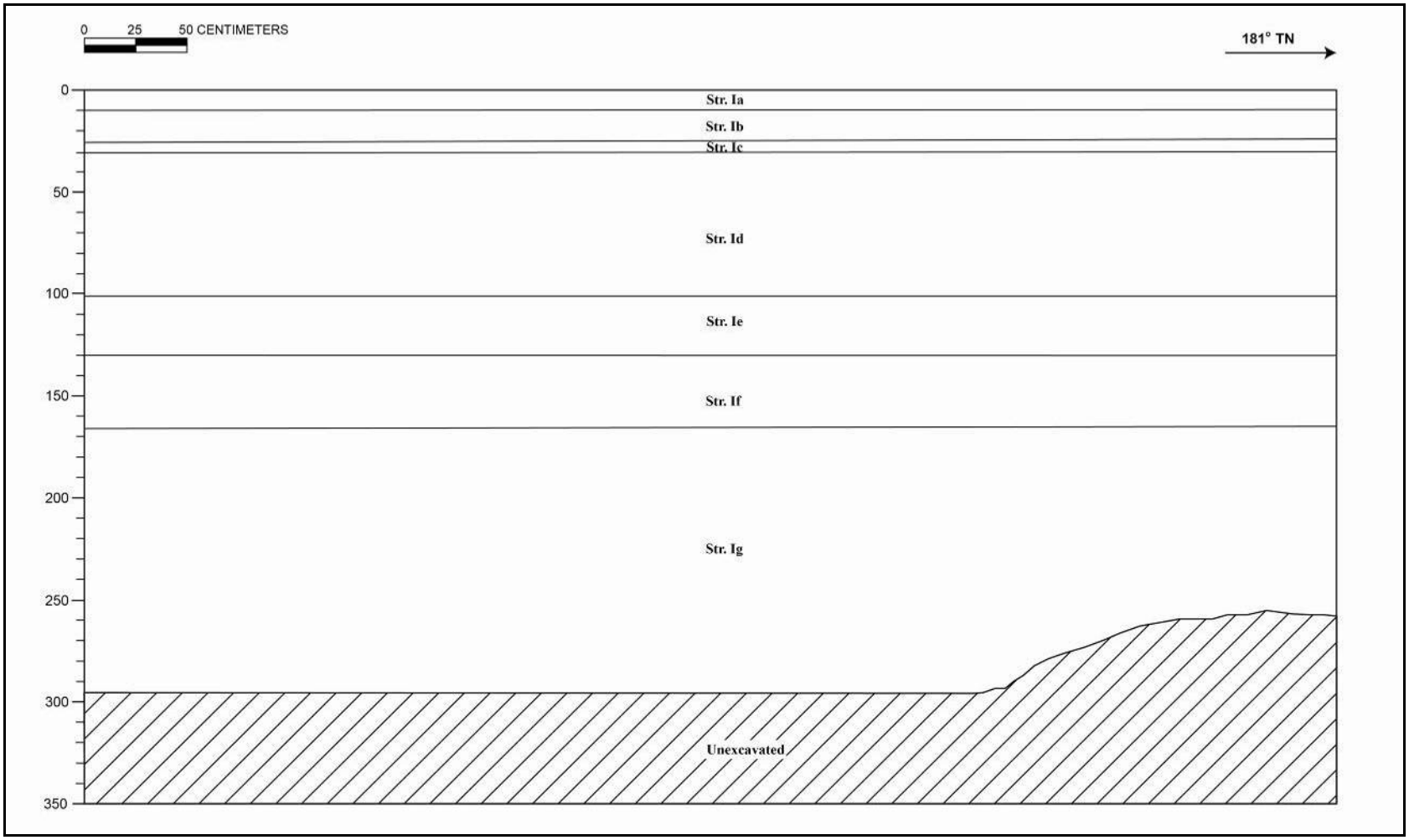


Figure 110. Airport Section 3, T-001 east profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-25	Fill; extremely gravelly loamy sand; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; base course
Ic	25-30	Fill; extremely gravelly sand; 10YR 4/4 (dark yellow brown); weak, fine, blocky structure; moist, very friable consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
Id	30-100	Fill; extremely gravelly silt; 5YR 3/4 (dark red brown); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contains subangular basalt gravel
Ie	100-130	Fill; gravelly clay loam; 10YR 3/4 (dark yellow brown); weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; contains subangular basalt gravel
If	130-165	Fill; very cobbly loam; 10YR 3/2 (very dark grayish brown); weak, fine, crumb structure; moist, very friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contains angular basalt cobbles
Ig	165-295	Fill; gravelly clay loam; 7.5YR 4/3 (brown); weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; lower boundary not visible; contains both angular and water worn gravel to cobbles, few small boulders, a bivalve shell; locally-procured sediment

7.2.2 Test Excavation 2 (T-002)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-003:066
Street:	Kamehameha Highway
Owner:	Harry B. Kronick Trust
Elevation:	8.4 m
UTM:	610208.4837 mE, 2363044.467 mN
Max Length/Width/Depth	3.6 m/1.0 m/2.75 m
Orientation:	200°/20° TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 2 (T-002) was located within a raised median (landscaped with *naupaka*) of Kamehameha Highway along a causeway and about 30 m north of Hālawa Stream at the mouth of Hālawa Valley (see Figure 38; Figure 111). Existing utilities near T-002 included a gas line about 2.0 m to the south and an irrigation line about 3.5 m to the east. T-002 was about 8 m above the water of Hālawa Stream. The excavation area was relatively level within the landscaping. T-002 was located on private property.

Summary of Background Research and Land Use: A reconstruction of the traditional Hawaiian landscape in the area tested by T-002 along lower Hālawa Stream (Klieger 1995:61) indicates no specific cultural activity (see Figure 95). The 1873 Lyons map of Pearl Lochs indicates the T-002 excavation area was formerly mud flats and about 30 m east of the former coast line (see Figure 94). The 1899 Beasley map shows the OR&L and an associated Hālawa Station about 250 m west of T-002 (see Figure 97). Early twentieth century maps (Figure 99, Figure 101, Figure 103 and Figure 105) show little development north of the mouth of Hālawa stream.

Documentation Limitations: T-002 was excavated to bedrock at a maximum depth of 2.75 mbs. There were no specific factors that limited the excavation of T-002.

Stratigraphic Summary: The stratigraphy of T-002 consisted of fill strata to the base of excavation **(**Figure 112 and Figure 113). Observed strata were imported sandy silt loam topsoil fill (Stratum Ia), coral gravel base course (Stratum Ib), extremely gravelly clay fill (Stratum Ic), and locally-procured clay fill (Stratum Id) overlying basalt bedrock. A concrete cylinder and concrete slab fragments were observed within Stratum Id between 2.10 mbs and 2.40 mbs. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 111. Photograph of Airport Section 3, T-002, general location looking towards Hālawa Stream, view to south

Figure 112. Photograph of Airport Section 3, T-002, general view of profile, view to southeast

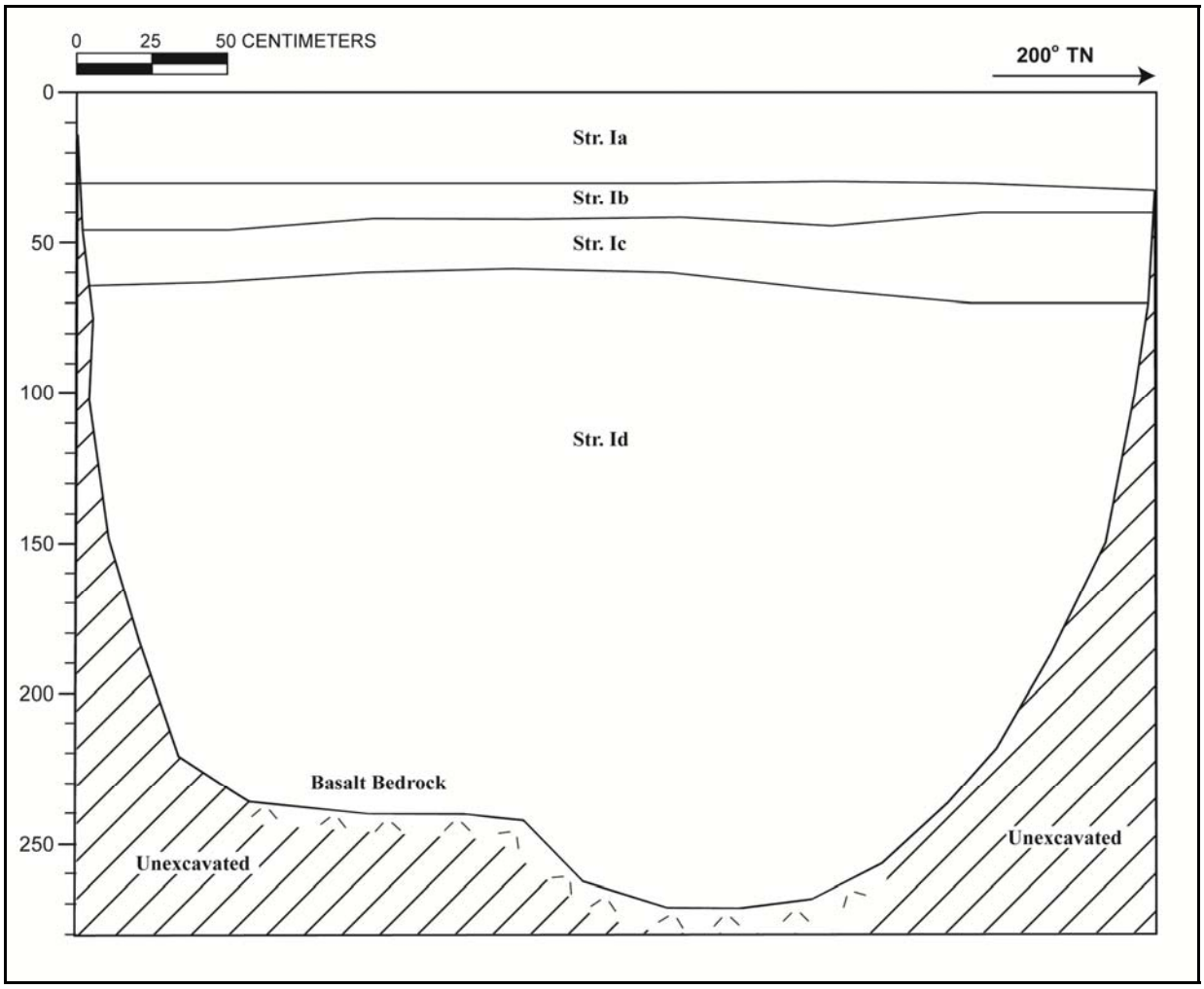


Figure 113. T-002 east profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-30	Fill; sandy silt loam; 10YR 4/3 (brown); structureless, single-grain, dry, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; many medium to coarse roots; topsoil; landscape fill (modern)
Ib	27-45	Fill; extremely gravelly silty sand ; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; few fine to medium roots; coral gravel
Ic	37-70	Fill; extremely gravelly clay; 10YR 4/4 (dark yellowish brown); structureless, single-grain; dry, weakly coherent consistency; slightly plastic; mixed origin; clear, smooth lower boundary; reworked alluvial silt loam with 60% coral and basalt cobbles and boulders
Id	60-275	Fill; clay; 10YR 4/2 (dark grayish brown); structureless, massive; moist, friable consistency; slightly-plastic; terrigenous origin; locally-procured fill with concrete debris; overlying basalt bedrock

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-002 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicates a change in reflectivity occurring around 0.25 mbs and again around 0.75 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was about 1.15 mbs.

Summary: T-002 was excavated to bedrock at a maximum depth of 2.75 mbs. There were no specific factors that limited the excavation of T-002. The stratigraphy consisted of fill (Strata Ia-Id) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). According to background research, T-002 was located within the former low-lying mud flats of Hālawa Stream. No cultural resources were observed. The data obtained from T-002 supports previous findings (cf. Avery et al. 1994 and Dye 1999) that this area generally exhibits extensive previous disturbance which likely destroyed any evidence of earlier sites.

7.2.3 Test Excavation 3 (T-003)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway
Owner:	State DOT Airports Division
Elevation:	3.3 m
UTM:	610147.4206 mE, 2362780.074 mN
Max Length/Width/Depth	3.04 m/0.9 m/2.18 m
Orientation:	283°/103° TN
Targeted Project Component:	Guideway Column
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 3 (T-003) was along the eastward (*mauka*) causeway of Kamehameha Highway, about 55 m south of the intersection with Hālawa Drive (see Figure 39; Figure 114). The causeway slopes about 2.04 m below the surface of the road.

Summary of Background Research and Land Use: According to the Lyons 1873 map of Pearl Lochs, T-003 was located in what used to be mudflats along the southwest side of Hālawa Stream and the northeast side of the Loko Kunana Fishpond (see Figure 94). A reconstruction of the traditional Hawaiian landscape along lower Hālawa Stream (Klieger 1995:61) indicates that the small Pu‘uone Kaulailoa Fishpond was located to the east of T-003 (see Figure 95). The 1899 Beasley map shows the OR&L about 150 m to the west of T-003 (see Figure 97). A 1933 U.S. Army War Department Fire Control map indicates a road extending through the present-day alignment (see Figure 101). By 1953 (AMS Puuloa map) there was a road grid on the west (*makai*) side of Kamehameha Highway, which likely represents present-day military roads and housing (see Figure 107).

Documentation Limitations: T-003 was excavated to a maximum depth of 2.18 mbs. Possible side wall collapse and concern for the integrity of the adjacent portion of Kamehameha Highway limited the archaeological excavation, investigation, and documentation procedures. Archaeologists were only allowed to view the excavation area from the east side due to unstable excavation edges. As such, the depths of the stratigraphy have been approximated from the ground surface rather than measuring from a level datum line.

Stratigraphic Summary: The stratigraphy of T-003 consisted of fill strata over natural sediment (Figure 115 and Figure 116). Observed strata were imported topsoil fill (Stratum Ia), gravelly sandy silt fill (Stratum Ib), extremely gravelly sand fill (Stratum Ic), and extremely stony sand fill (Stratum Id) overlying natural clay loam with basalt boulders (Stratum II), and natural clay loam with decomposing coral and a marine shell (Stratum III). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

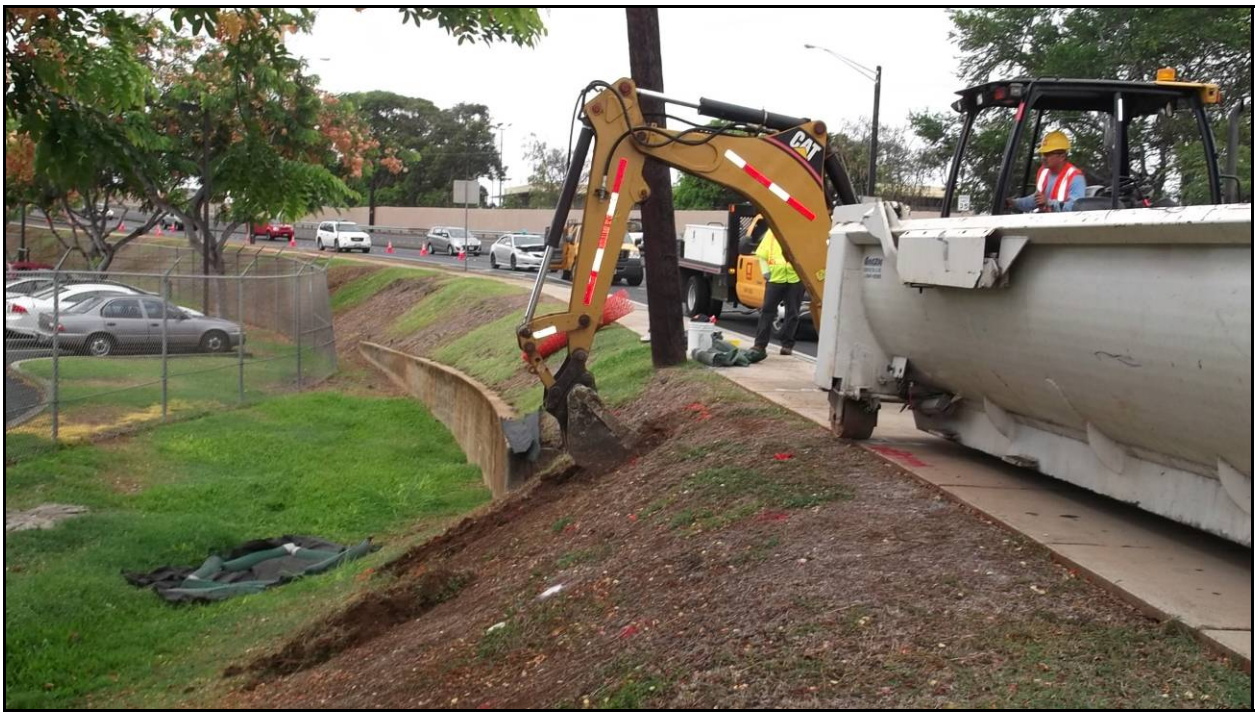


Figure 114. Photograph of Airport Section 3, T-003, general location, view to southwest

Figure 115. Photograph of Airport Section 3, T-003, general view of profile, view to west

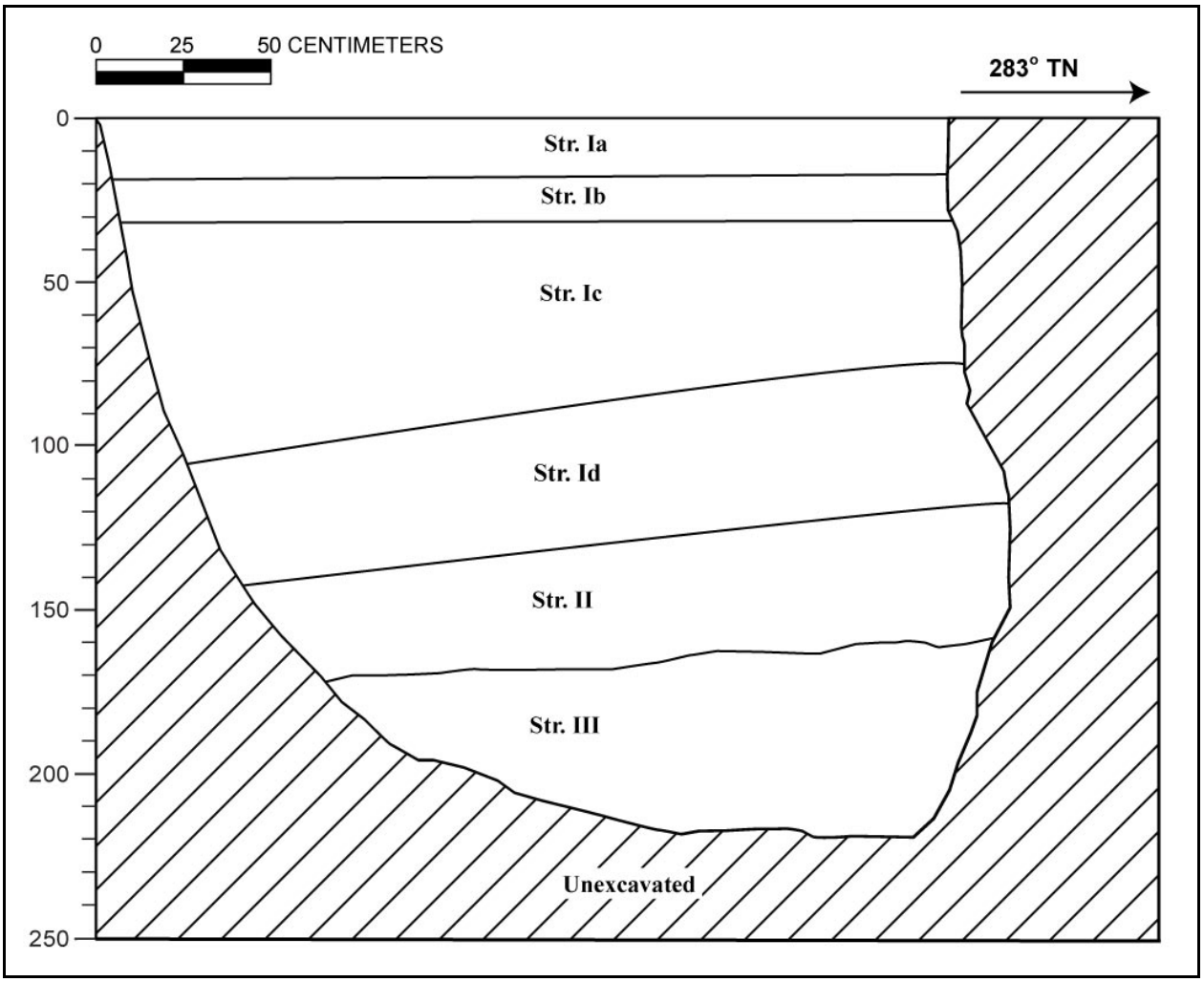


Figure 116. T-003 south profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-17	Topsoil fill; silt loam; 10YR 3/6 (dark yellowish brown); weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; clear; smooth lower boundary; many very fine to fine roots
Ib	17-30	Fill; gravelly sandy silt; 10YR 5/2 (brown) mottled with (50%) (pale brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; very fine to fine roots common
Ic	30-110	Fill; extremely gravelly sand; 10YR 5/1 (gray); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; few very fine roots; basalt gravel fill
Id	75-145	Fill; extremely stony sand; 10YR 4/4 (dark yellowish brown) structureless, single-grain; moist, loose consistency; terrigenous origin; abrupt, smooth lower boundary; contained basalt boulders
II	130-170	Natural; clay loam; 10YR 4/3 (brown); weak, fine crumb structure; moist, friable consistency; plastic; terrigenous origin; diffuse, smooth lower boundary; few fine to medium roots; contained angular basalt gravels and boulders; natural alluvium
III	160-218	Natural; clay loam; 10YR 3/2 (very dark grayish brown); moderate, fine, blocky structure; moist, firm consistency; plastic; terrigenous origin; lower boundary not visible; contains some decomposing coral and a bivalve shell (not collected due to excavation instability)

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains were observed. A bivalve shell was observed in Stratum III (natural clay loam) but was not collected due to excavation instability.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have indicated the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-003 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.20 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 0.75 mbs.

Summary: T-003 was excavated to a maximum depth of 2.18 mbs. The stratigraphy consisted several layers of fill (Strata Ia-Id) overlying natural sediments (Strata II-III). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). A single bivalve shell was observed in Stratum III but not collected. No cultural resources were identified.

Avery et al. (1994:30) documented a bore hole excavation (# 50) about 40 m northwest of T-003 at the intersection of Arizona Road and Kamehameha Highway. Bore Hole # 50 had a 4.5 m thick historic fill layer. These data suggest that the fill continues inland but thins out significantly with elevation.

7.2.4 Test Excavation 4 (T-004)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002 [Plat]
Street:	Kamehameha Highway
Owner:	State DOT Airports Division
Elevation:	4.2 m
UTM:	610123.9371 mE, 2362742.709 mN
Max Length/Width/Depth	3.0 m/1.0 m/1.85 mbs
Orientation:	171°/351° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 4 (T-004) was located in the narrow end of the south-side median causeway of Kamehameha Highway about 100 m south of the intersection with Hālawa Drive and Arizona Road (see Figure 39; Figure 117). The median and roads were about 1.8 to 2.1 m higher than the excavtion area on either side.

Summary of Background Research and Land Use: According to the 1873 map of Pearl Lochs by Lyons, T-004 is within extensive mudflats along the east (*mauka*) side of the former Loko Kunana Fishpond and south of the mouth of Hālawa Stream (see Figure 94). The 1899 Beasley map indicates that the OR&L was about 150 m west of T-004 (see Figure 97). The 1933 U.S. Army War Department Fire Control map shows a road extending through the present-day alignment (see Figure 101). By 1953 (AMS Puuloa map) there was a road grid on the west (*makai*) side of the highway, which likely represents military roads and housing (see Figure 107).

Documentation Limitations: T-004 was excavated to bedrock at a depth of 1.85 mbs. There were no other specific factors limiting documentation.

Stratigraphic Summary: The stratigraphy of T-004 consisted of fill over bedrock at the base of excavation (Figure 118 and Figure 119). Observed strata were asphalt (Stratum Ia), basalt gravel base course (Stratum Ib), and very gravelly loam fill (Stratum Ic) overlying natural basalt bedrock (Stratum II). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

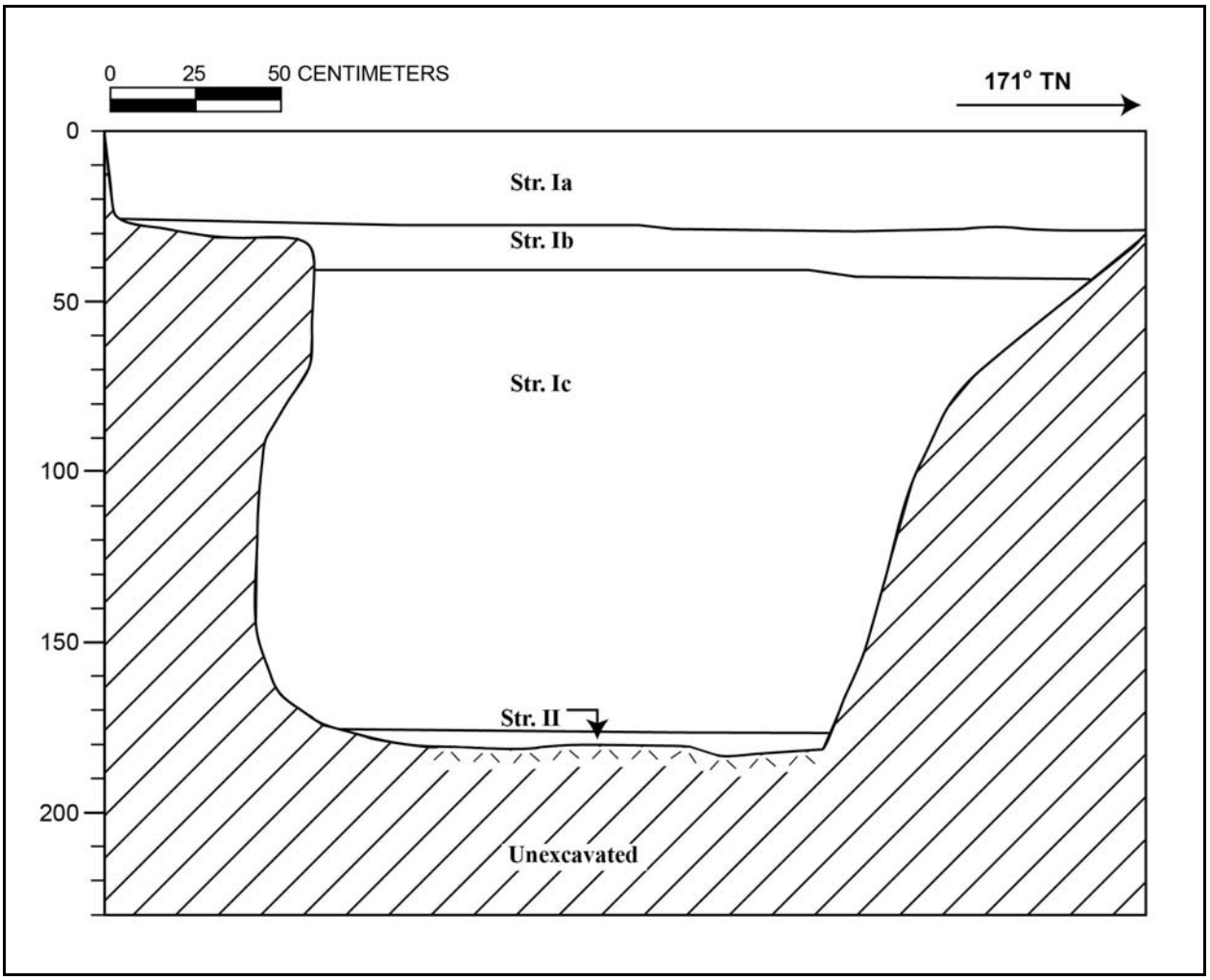
Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

Figure 117. Photograph of Airport Section 3, T-004, general location, view to north

Figure 118. Photograph of Airport Section 3, T-004, general view of profile, view to northeast



Stratum	Depth (cmbs)	Description
Ia	0-25	Asphalt
Ib	25-40	Fill; extremely gravelly sand; 10YR 6/1 (gray); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; basalt gravel base course
Ic	40-180	Fill; very gravelly loam; 10YR 3/3 (dark brown); weak, fine crumb structure; moist, friable consistency; slightly plactic; terrigenous origin; very abrupt, irregular lower boundary
II	180-185	Natural; basalt bedrock

Figure 119. T-004 east profile and stratigraphic description

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-004 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.40 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 0.75 mbs.

Summary: T-004 was excavated to bedrock at a depth of 1.85 mbs. The stratigraphy of T-004 consisted of fill (Strata Ia-Ic) over bedrock (Stratum II) at the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No cultural resources were identified within T-004.

7.2.5 Test Excavation 5 (T-005)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002 [Plat]
Street:	Kamehameha Highway
Owner:	State DOT Airports Division
Elevation:	14.8 m
UTM:	610292.6790 mE, 2361908.039 mN
Max Length/Width/Depth:	3.4 m/0.97 m/1.25 m
Orientation:	178°/358° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Kokokahi very stony clay (KTKE)

Setting: Test Excavation 5 (T-005) was located in a road cut in Kamehameha Highway about 110 m north of the intersection at Makin Place (see Figure 42; Figure 120). The excavation area was situated on a gentle south-to-north upward slope of Makalapa Crater, between two ridges of tuff.

Summary of Background Research and Land Use: According to the 1933 U.S. Army War Department Fire Control map of Waipahu Quadrangle, the location of T-005 was adjacent to a government road that eventually became the present-day alignment of Kamehameha Highway (see Figure 101). All other historic maps showed no structures or natural features in the vicinity of T-005 on the undeveloped lower slopes of Makalapa Crater.

Documentation Limitations: T-005 was excavated to bedrock at a maximum depth of 1.25 mbs. There were no specific factors that limited documentation of T-005.

Stratigraphic Summary: The stratigraphy of T-005 consisted of several fill strata overlying natural sediment and volcanic tuff bedrock (Figure 121 and Figure 122). Observed strata were asphalt (Stratum Ia), basalt gravel base course (Stratum Ib), gravelly clay loam fill (Stratum Ic), and very gravelly sand fill (Stratum Id), overlying natural extremely gravelly loam (Stratum II) and volcanic tuff bedrock (Stratum III). The stratigraphy conformed to the USDA soil survey designation of Kokokahi very stony clay (KTKE).

Artifact Discussion: No artifacts were observed.

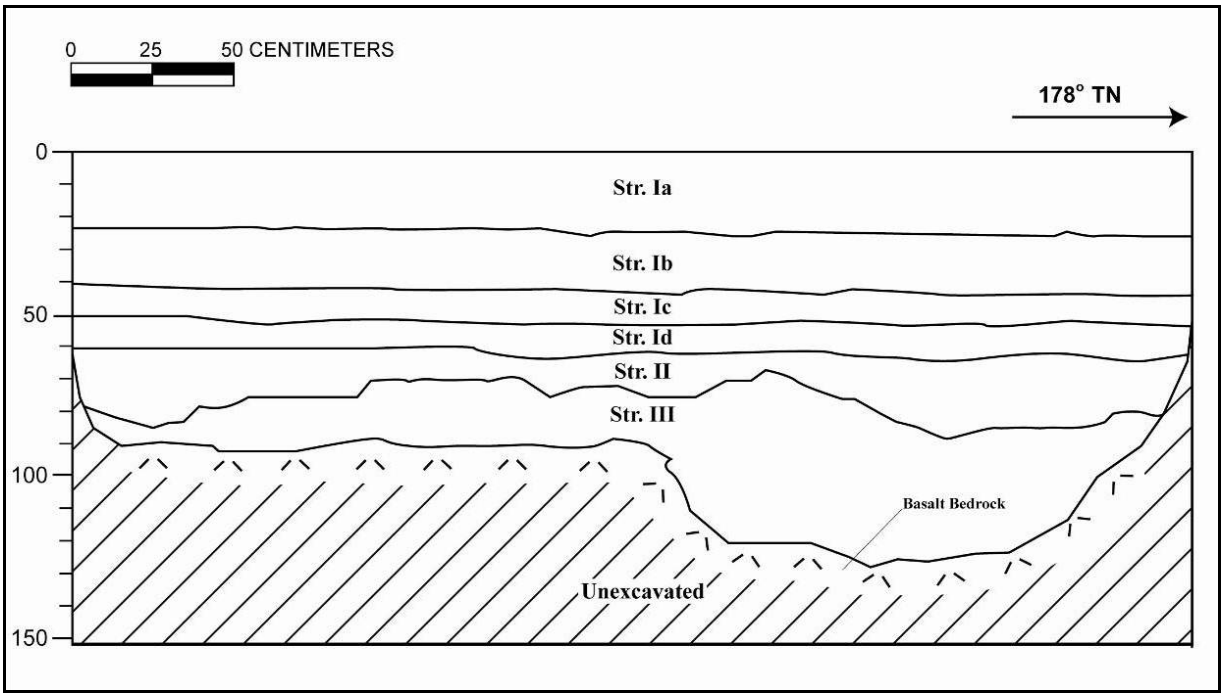
Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

Figure 120. Photograph of Airport Section 3, T-005, general location, view to north

Figure 121. Photograph of Airport Section 3, T-005, general view of profile, view to northeast



Stratum	Depth (cmbs)	Description
Ia	0-22	Asphalt
Ib	20-40	Fill; extremely gravelly sand; 10YR 6/1 (gray); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	40-50	Fill; gravelly clay loam; 7.5YR 3/3 (dark brown); weak, fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; imported fill material associated with grading and leveling for road
Id	50-60	Fill; very gravelly coarse sand; 10YR 8/2 (very pale brown) mottled with 50%, very coarse 10YR 6/1 (gray); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; basalt and coral gravels in coarse sand matrix
II	60-85	Natural; extremely gravelly loam; 10YR 3/2 (very dark grayish brown); weak, medium, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, wavy lower boundary; natural colluvial sediment truncated during cutting and bulldozing for modern road surface
III	65-125	Natural; basalt bedrock; 10YR 3/1 (very dark gray); massive structure; indurated; non-plastic; terrigenous origin; lower boundary not visible

Figure 122. T-005 east profile and stratigraphic description

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-005 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.50 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 0.90 mbs.

Summary: T-005 was excavated to bedrock at a maximum depth of 1.25 mbs. The stratigraphy consisted of several fill (Strata Ia-Id) overlying natural sediment (Stratum II) and bedrock (Stratum III). The stratigraphy conformed to the USDA soil survey designation of Kokokahi very stony clay (KTKE). No cultural resources were identified.

7.2.6 Test Excavation 6 (T-006)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i `Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002 [Plat]
Street:	Kamehameha Highway at Radford Drive
Owner:	Federal Government
Elevation:	8.45 m
UTM:	610372.8607 mE, 2361590.969 mN
Max Length/Width/Depth	6.7 m/0.76 m/2.20 m
Orientation:	170°/350° TN
Targeted Project Component:	Utility Corridor
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 6 (T-006) was located in a road cut on the northern side of Kamehameha Highway where it intersects with Makalapa Road and Radford Drive (see Figure 43; Figure 123). There were no nearby utilities. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Lyons' 1873 map of Pearl Lochs indicates the presence of Wailolowai Stream in a swale within this area (see Figure 94). The Lyons map also depicts a trail crossing possibly related to a fresh water source in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir about 500 m to the east (see Figure 101). This ditch bifurcates and both ditches descend in a southwesterly direction. This area appears to have been part of Honolulu Plantation sugar cane "Field 1" by 1935 (see Figure 103). A 1943 War Department Aiea quad map shows substantial housing development adjacent to the southwest and east (see Figure 105).

Documentation Limitations: T-006 was excavated to a maximum depth of 2.20 mbs in natural sediment. The base of excavation was limited due to safety protocols and instability of the sidewalls.

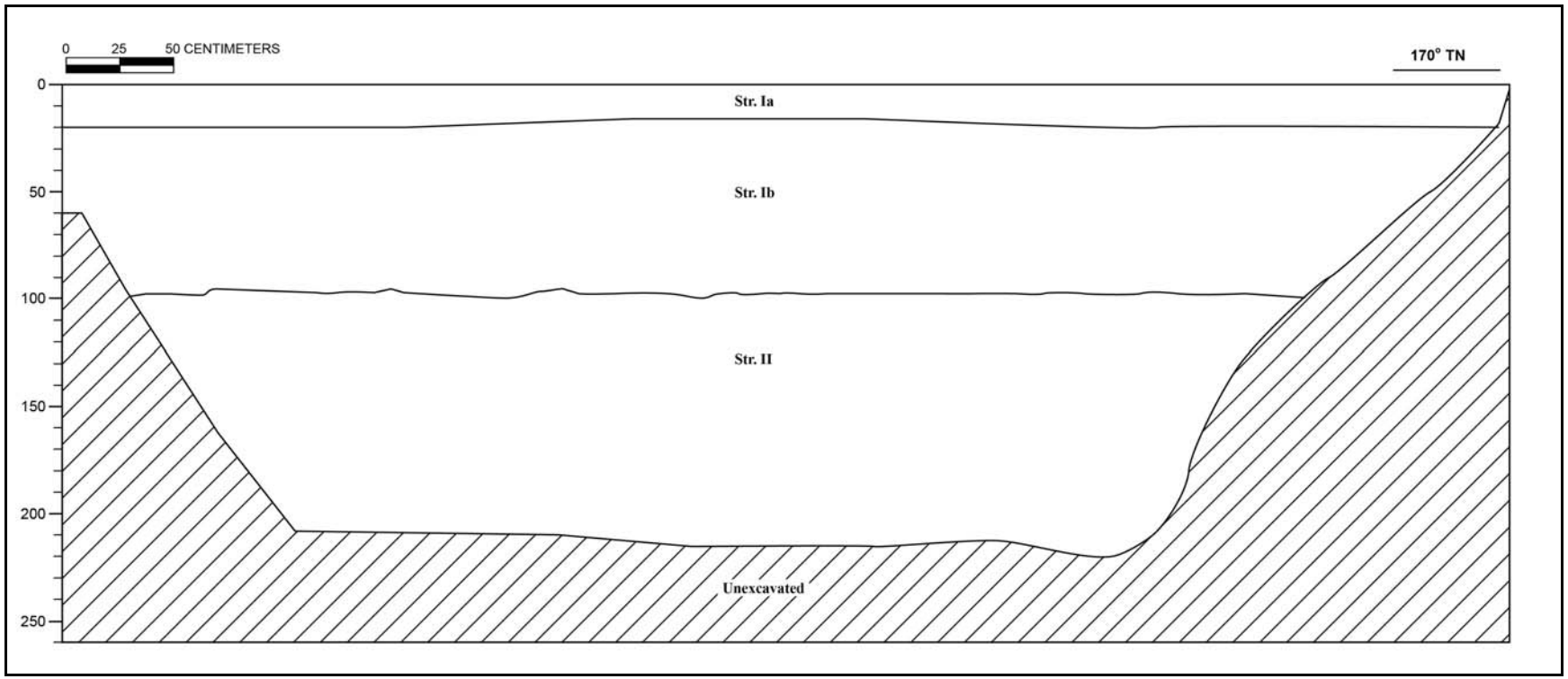
Stratigraphic Summary: The stratigraphy consisted of fill strata over natural sediment (Figure 124 and Figure 125). Observed strata were asphalt (Stratum Ia), very gravelly to cobbly crushed coral fill (Stratum Ib), and natural very cobbly clay loam (Stratum II). The large quantity of water-rounded basalt cobbles within the upper and lower boundaries of Stratum II may be indicative of high energy alluvial deposition. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 123. Photograph of Airport Section 3, T-006, general location (Radford Drive at left), view to south

Figure 124. Photograph of Airport Section 3, T-006, general view of profile, view to southeast



Stratum	Depth (cmbs)	Description
Ia	0-19	Asphalt
Ib	19-100	Fill; very gravelly to cobbly sand; 2.5Y 8/2 (pale brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
II	95-220	Natural; very cobbly clay loam; 7.5YR 2.5/3 (very dark brown); weak, medium, blocky structure; moist, friable consistency; plastic; terrigenous origin; lower boundary not visible; bulk sample contained one unidentified marine shell and sea urchin

Figure 125. T-006 east profile and stratigraphic description

Faunal Remains Discussion: No osseous faunal remains or shell material were observed during the excavation of T-006. See lab results below for bulk sample contents.

Lab Results: A 2.5 liter bulk sample from Stratum II, between 1.62 and 1.75 mbs, was collected from the excavator bucket due to the instability of the excavation sidewalls. A portion of the sediment sample was submitted for pollen analysis (See Results of Laboratory Analysis, Section 8.2.7). The remainder of the bulk sample was wet screened and yielded an unidentified marine shell (< 0.1 g), sea urchin (*Echinometra mathaei*) (< 0.1 g), and water-rounded gravel (155.6 g). The marine shell remains are considered to have been deposited by natural processes and not the result of human discard. The results of laboratory analysis indicate a riparian environment.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity occurred at about 0.50 mbs.

GPR depth profiles for T-006 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within the fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 cmbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 0.75 cmbs.

Summary: T-006 was excavated to a maximum depth of 2.20 mbs. The stratigraphy consisted fill (Strata Ia-Ib) over natural sediment (Stratum II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The marine shell and sea urchin (*Echinometra mathaei*) observed are considered to be naturally deposited. The results of laboratory analysis indicate a riparian environment. No cultural resources were identified.

7.2.7 Test Excavation 7 (T-007)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway (*mauka* or east of highway)
Owner:	Federal Government
Elevation:	8.7 m
UTM:	610420.5539 mE, 2361504.310 mN
Max Length/Width/Depth	6.1 m/0.8 m/2.43 m
Orientation:	54°/234° TN
Targeted Project Component:	Pearl Harbor Naval Base Station (Station Entrance Building)
USDA Soil Designation:	Hanalei silty clay (HnB)/Rock land (rRk)

Setting: Test Excavation 7 (T-007) was located at the base of an outcrop ledge in a field east of Kamehameha Highway and about 55 m south of Radford Drive (see Figure 43; Figure 126 and Figure 127). The excavation area was relatively level then the land slopes gently downward to the north. The rock ledge was about 25 m south of T-007.

Summary of Background Research and Land Use: T-007 and nearby T-008, T-009, T-010, and T-011 were all located in the vicinity of the Pearl Harbor Naval Base Station footprint (see Figure 126). This location is in a soil swale between two easterly extending ridges of the Āliamanu and Makalapa Craters. The 1873 Lyons map of Pearl Lochs shows what appears to be a small unnamed rivulet in this swale flowing into the small Wailolowai Fishpond at the Southeast Loch of Pearl Harbor (see Figure 94). A north-south trending trail is also shown in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir located 500 m to the east, passing directly south of the Pearl Harbor Naval Base Station location and bifurcating to the west with both ditches descending in a generally southwesterly direction (see Figure 101). This area appears to have been a part of Honolulu Plantation sugar cane “Field 1” by 1935 (see Figure 103). A 1943 U.S. Army War Department map shows substantial housing development adjacent to the southwest and east of the Pearl Harbor Naval Base Station footprint (see Figure 105).

Documentation Limitations: T-007 was excavated to bedrock at a maximum depth of 2.43 mbs. T-007 was rotated 90° from the original orientation in order to minimize impact to the root system of a large *Acacia* tree east of the excavation. An arborist was present and monitored excavation to minimize impact to the roots. Documentation at the base of excavation was limited due to safety protocols and instability of the excavation sidewalls. A PVC sprinkler line limited excavation in the southwestern end of T-007.

Stratigraphic Summary: The stratigraphy of T-007 consisted of fill overlying bedrock (Figure 128 and Figure 129). Observed strata were landscaping fill (Stratum Ia), and gravelly clay loam

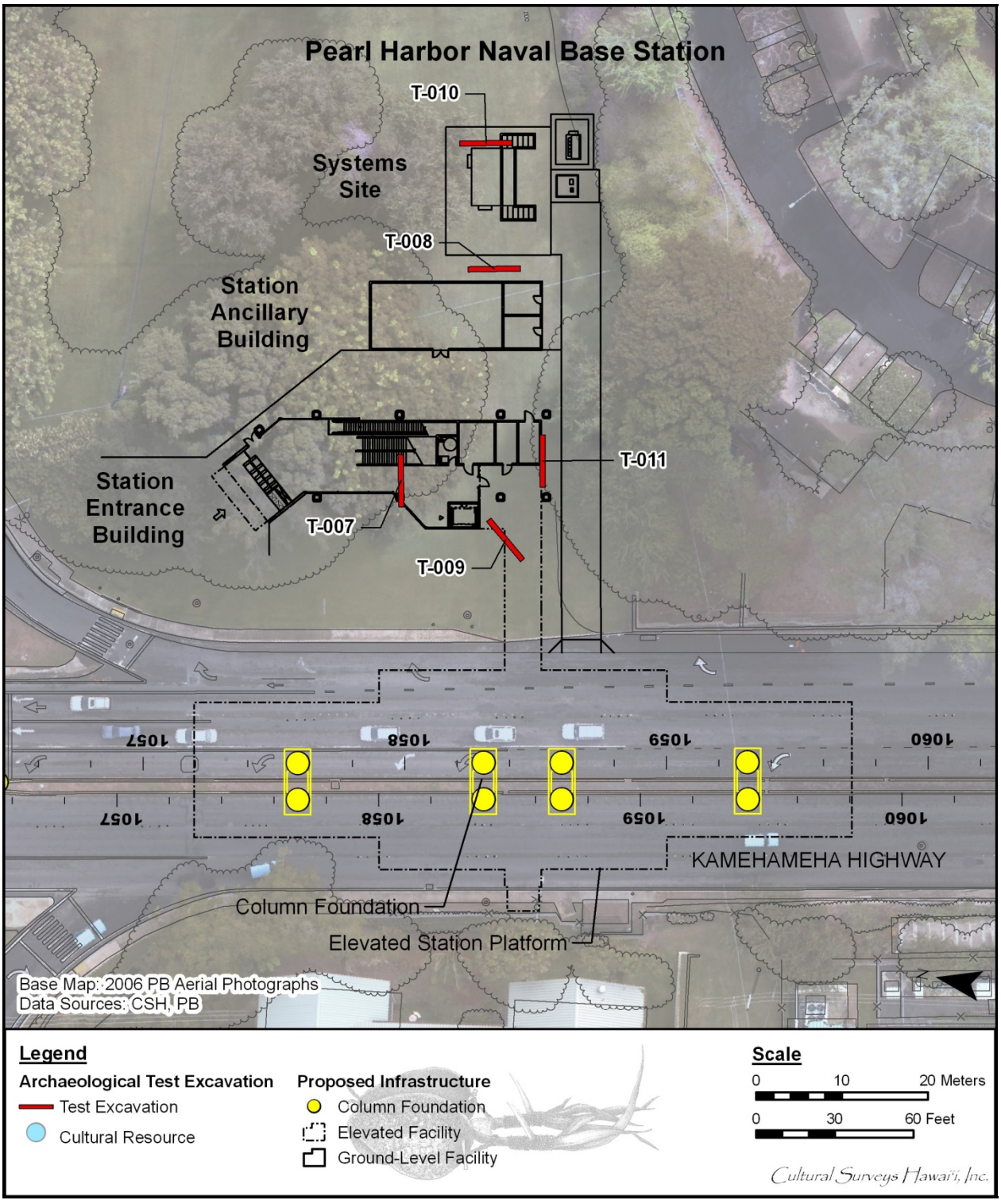


Figure 126. Overview of T-007 through T-011 locations in relation to the footprint of the proposed Pearl Harbor Naval Base Station

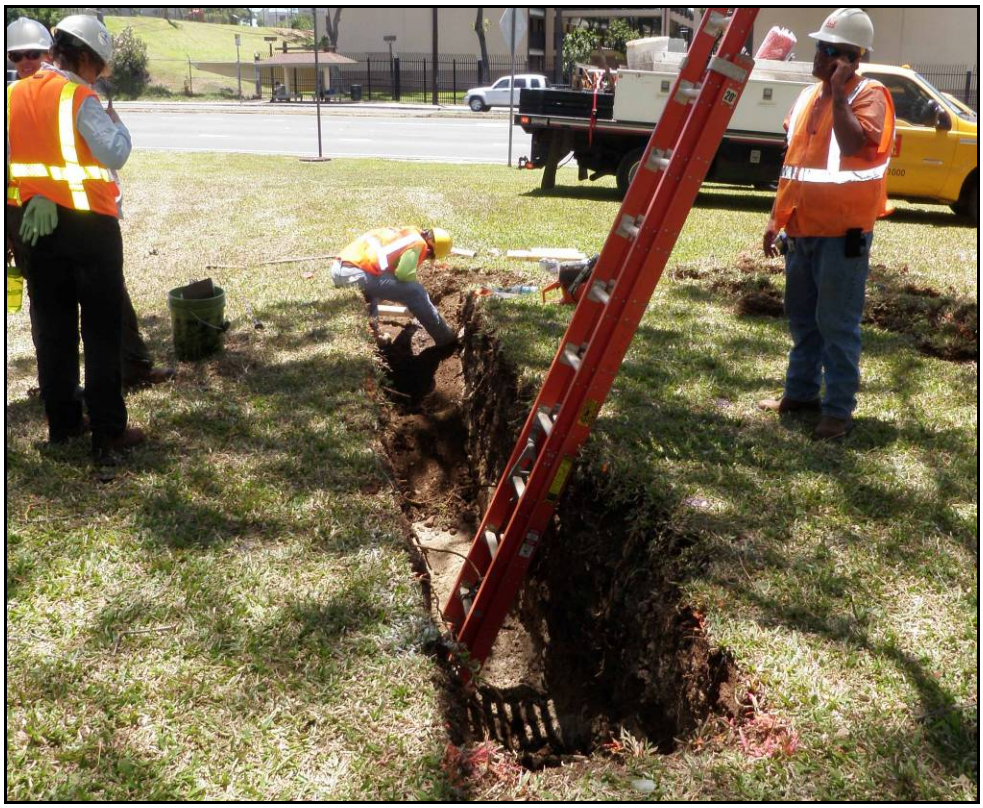
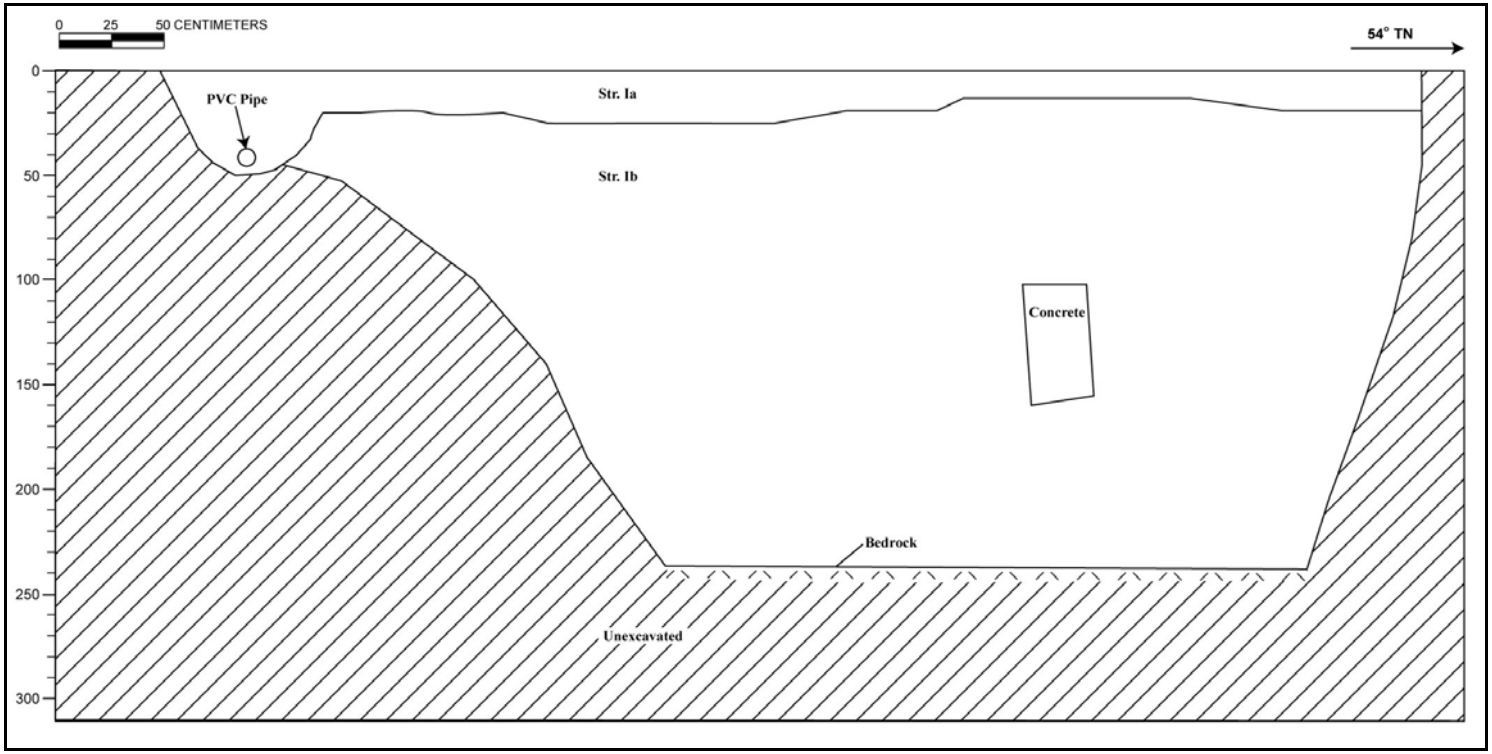


Figure 127. Photograph of Airport Section 3, T-007, general location, Kamehameha Highway in the background, view to west

Figure 128. T-007 northwest profile, view to northwest



Stratum	Depth (cmbs)	Description
Ia	0-24	Fill; loam; 7.5YR 4/3 (brown); weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; fine roots common; imported topsoil
Ib	24-243	Fill; gravelly clay loam; 10YR 3/2 (very dark grayish brown); weak, medium, blocky structure; moist, very friable consistency; slightly plastic; terrigenous origin; very abrupt, smooth lower boundary; common, fine to medium roots common; contained a large concrete block and coral gravel

Figure 129. T-007 northwest profile and stratigraphic description

fill (Stratum Ib) overlying bedrock. The bedrock surface may have been graded prior to deposition of the Stratum Ib fill. Stratum Ib contained a large concrete block visible in the west wall. The USDA soil survey indicated the location of T-007 as along an interface of Hanalei silty clay (HnB) and Rock land (rRk). The stratigraphy conformed to the USDA soil survey designation of Rock land (rRk).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-007 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. A utility was observed during excavation but was not clearly defined in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-007 was excavated to bedrock at a maximum depth of 2.43 mbs. The stratigraphy consisted of fill (Strata Ia-Ib) overlying natural bedrock. The stratigraphy conformed to the USDA soil survey designation of Rock land (rRk) but not to the designation of Hanalei silty clay (HnB). No cultural resources were identified in T-007.

7.2.8 Test Excavation 8 (T-008)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway (*mauka* or east of highway)
Owner:	Federal Government
Elevation:	9.2 m
UTM:	610446.9139 mE, 2361498.759 mN
Max Length/Width/Depth	6.2 m/0.8 m/0.55 m
Orientation:	180°/360° TN
Targeted Project Component:	Pearl Harbor Naval Base Station (Train Control and Communications Room)
USDA Soil Designation:	Rock land (rRk)

Setting: Test Excavation 8 (T-008) was located about 45 m east of Kamehameha Highway and about 65 m south of Radford Drive in a field at the base of an outcrop ledge (see Figure 43 and Figure 128; Figure 130). The excavation area was relatively level and downslope from the outcrop ledge to the south.

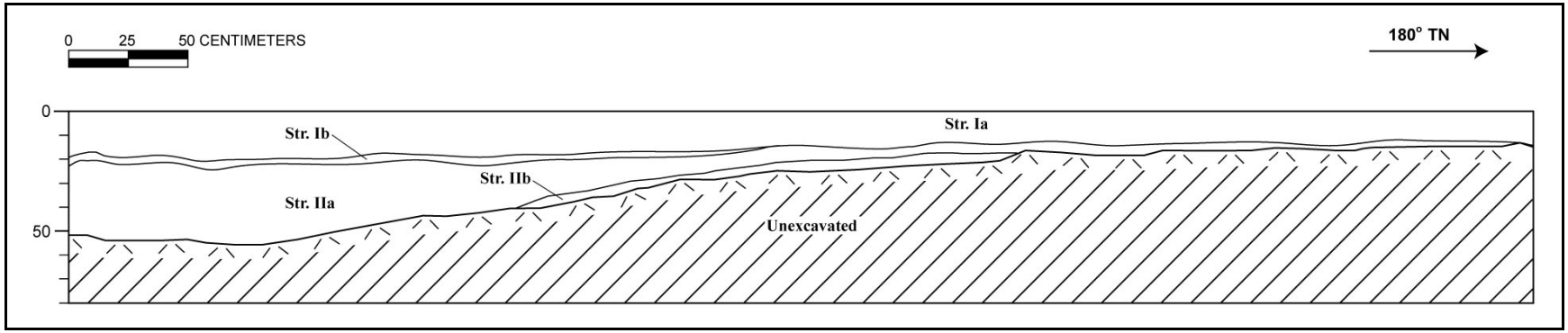
Summary of Background Research and Land Use: T-008 and nearby T-007, T-009, T-010, and T-011 were all located in the vicinity of the Pearl Harbor Naval Base Station footprint (see Figure 126). This location is in a soil swale between two easterly extending ridges of the Āliamanu and Makalapa Craters. The 1873 Lyons map of Pearl Lochs shows what appears to be a small unnamed rivulet in this swale flowing into the small Wailolowai Fishpond at the Southeast Loch of Pearl Harbor (see Figure 94). A north-south trending trail is also shown in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir located 500 m to the east, passing directly south of the Pearl Harbor Naval Base Station location and bifurcating to the west with both ditches descending in a generally southwesterly direction (see Figure 101). This area appears to have been a part of Honolulu Plantation sugar cane “Field 1” by 1935 (see Figure 103). A 1943 U.S. Army War Department map shows substantial housing development adjacent to the southwest and east of the Pearl Harbor Naval Base Station footprint (see Figure 105).

Documentation Limitations: T-008 was excavated to bedrock at a maximum depth 0.55 mbs. There were no specific factors that limited documentation of T-008.

Stratigraphic Summary: The stratigraphy of T-008 consisted of fill overlying bedrock (Figure 131 and Figure 132). Observed strata were topsoil (Stratum Ia) and sand fill (Stratum Ib), overlying naturally-decomposing basalt bedrock (Stratum IIa) that graded into solid basalt bedrock (Stratum IIb). The stratigraphy conformed to the USDA soil survey designation of Rock land (rRk).

Figure 130. Photograph of Airport Section 3, T-008, general location, Radford Drive in background, view to north

Figure 131. Photograph of Airport Section 3, T-008 east profile, view to east



Stratum	Depth (cmbs)	Description
Ia	0-20	Fill; loam; 7.5YR 3/4 (dark brown); weak, fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; common, fine roots common; imported topsoil fill with grass
Ib	14-17	Fill; sand; 5YR 8/1 (white); structureless, single-grain; moist, loose consistency; marine origin; abrupt, smooth lower boundary; contained small pieces of coral
IIa	13-55	Natural; decomposing bedrock; 2.5YR 5/3 (light olive brown); weak, fine, crumb structure; dry, hard consistency; non-plastic; terrigenous origin; diffuse, wavy lower boundary; few fine roots; very gravelly to cobbly natural decomposing basalt
IIb	20-40	Natural; basalt bedrock; 2.5YR 5/3 (light olive brown); massive structure; indurated; non-plastic; terrigenous origin; lower boundary not visible

Figure 132. T-008 east profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-008 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-008 was excavated to bedrock at a maximum depth 0.55 mbs. The stratigraphy of T-008 consisted of fill (Strata Ia-Ib) overlying naturally-decomposing basalt bedrock (Stratum IIa) that graded into solid basalt bedrock (Stratum IIb). The stratigraphy conformed to the USDA soil survey designation of Rock land (rRk). No cultural resources were encountered.

7.2.9 Test Excavation 9 (T-009)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway (*mauka* or east of highway)
Owner:	State DOT Airports Division
Elevation:	8.7 m
UTM:	610416.3218 mE, 2361490.985 mN
Max Length/Width/Depth	5.3 m excavated (6.2 m grass removed)/1.35 m/0.50 m
Orientation:	45°/225° TN
Targeted Project Component:	Pearl Harbor Naval Base Station (Elevator Shaft)
USDA Soil Designation:	Rock land (rRk)

Setting: Test Excavation 9 (T-009) was located at the base of an outcrop ledge in a field about 10 m east of Kamehameha Highway and about 67 m south of Radford Drive (see Figure 43 and Figure 126; Figure 133). The excavation area was relatively level and downslope from the outcrop ledge to the south.

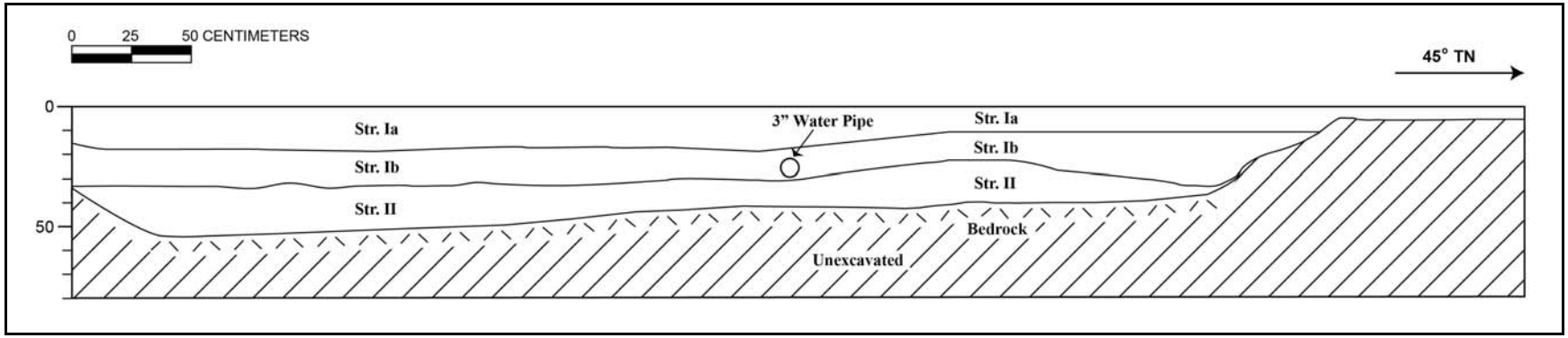
Summary of Background Research and Land Use: T-009 and nearby T-007, T-008, T-010, and T-011 were all located in the vicinity of the Pearl Harbor Naval Base Station footprint (see Figure 126). This location is in a soil swale between two easterly extending ridges of the Āliamanu and Makalapa Craters. The 1873 Lyons map of Pearl Lochs shows what appears to be a small unnamed rivulet in this swale flowing into the small Wailolowai Fishpond at the Southeast Loch of Pearl Harbor (seeFigure 94). A north-south trending trail is also shown in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir located 500 m to the east, passing directly south of the Pearl Harbor Naval Base Station location and bifurcating to the west with both ditches descending in a generally southwesterly direction (see Figure 101). This area appears to have been a part of Honolulu Plantation sugar cane “Field 1” by 1935 (see Figure 103). A 1943 U.S. Army War Department Aiea quad map shows substantial housing development adjacent to the southwest and east of the Pearl Harbor Naval Base Station footprint (see Figure 105).

Documentation Limitations: T-009 was excavated to decomposing bedrock at a maximum depth of 0.50 mbs. A PVC water pipe was encountered crossing diagonally through the center of T-009. The excavation sidewalls were expanded around the pipe and the pipe was cut so excavation was not limited.

Stratigraphic Summary: The stratigraphy consisted of fill over bedrock (Figure 134 and Figure 135). Observed strata were sod with grass (Stratum Ia) and imported clay loam fill (Stratum Ib) overlying decomposing bedrock (Stratum II). The bedrock was formed from volcanic tuff deposits from the Makalapa and/or Āliamanu events. The stratigraphy conformed to the USDA soil survey designation of Rock land (rRk).

Figure 133. Photograph of Airport Section 3, T-009, general location, view to southwest

Figure 134. Photograph of Airport Section 3, T-009, view to northwest



Stratum	Depth (cmbs)	Description
Ia	0-17	Fill; loam; 7.5YR 3/4 (dark brown); weak, fine, crumb structure; moist, very friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; many very fine to fine roots; imported fill with grass
Ib	15-31	Fill; clay loam; 2.5YR 3/4 (dark reddish brown); weak, fine, crumb structure; moist, very friable consistency; slightly plastic; clear, smooth lower boundary; very fine to fine roots common; imported fill likely used for leveling former land surface
II	31-50	Natural; decomposing volcanic tuff bedrock; 2.5YR 5/3 (light olive brown); very gravelly, weak, fine, crumb structure; hard consistency; non-plastic; terrigenous origin; lower boundary not visible; deposit consisting of very gravelly decomposing natural tuff overlying bedrock

Figure 135. T-009 northwest profile and stratigraphic description

Artifact Discussion: Several small glass fragments were observed in Stratum Ia and Stratum Ib. The glass fragments were not collected due to the lack of datable attributes and in consideration of their provenience within modern stratigraphic deposits (sod and underlying loam).

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-009 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. A utility was encountered during excavation but was not observed in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-009 was excavated to decomposing bedrock at a maximum depth of 0.50 mbs. The stratigraphy consisted of sod (Stratum Ia) and fill (Stratum Ib) over natural sediment (Stratum II). The stratigraphy conformed to the USDA soil survey desgination of Rock land (rRk). Several small glass fragments were observed in fill Strata Ia and Ib.

7.2.10 Test Excavation 10 (T-010)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway (*mauka* or east of highway)
Owner:	Federal Government
Elevation:	9.6 m
UTM:	610461.0399 mE, 2361502.710 mN
Max Length/Width/Depth	6.25 m/0.9 m/0.59 m
Orientation:	351°/171° TN
Targeted Project Component:	Pearl Harbor Naval Base Station (proposed Systems Site # 25)
USDA Soil Designation:	Rock land (rRk)

Setting: Test Excavation 10 (T-010) was located at the base of an outcrop ledge in a field less than 15 m east of Kamehameha Highway and about 66 m south of Radford Drive (see Figure 43 and Figure 126; Figure 136). The excavation area was relatively level with the surrounding land surface. A large exposed bedrock slope was identified about 15 m south of T-010.

Summary of Background Research and Land Use: T-010 and nearby T-007, T-008, T-009, and T-011 were all located in the vicinity of the Pearl Harbor Naval Base Station footprint (see Figure 126). This location is in a soil swale between two easterly extending ridges of the Āliamanu and Makalapa Craters. The 1873 Lyons map of Pearl Lochs shows what appears to be a small unnamed rivulet in this swale flowing into the small Wailolowai Fishpond at the Southeast Loch of Pearl Harbor (see Figure 94). A north-south trending trail is also shown in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir located 500 m to the east, passing directly south of the Pearl Harbor Naval Base Station location and bifurcating to the west with both ditches descending in a generally southwesterly direction (see Figure 101). This area appears to have been a part of Honolulu Plantation sugar cane “Field 1” by 1935 (see Figure 103). A 1943 U.S. Army War Department Aiea quad map shows substantial housing development adjacent to the southwest and east of the Pearl Harbor Naval Base Station footprint (see Figure 105).

Documentation Limitations: T-010 was excavated to bedrock at a maximum depth of 0.59 mbs. There were no specific factors that limited documentation of T-010.

Stratigraphic Summary: The stratigraphy of T-010 consisted of topsoil over natural sediment (Figure 137 and Figure 138). Observed strata were topsoil (Stratum I), natural extremely gravelly sand with sparse cultural material (Stratum II), and volcanic tuff bedrock (Stratum III). Stratum II was considered to be a possible remnant former land surface (A-horizon) that was horizontally truncated and leveled. Stratum III (bedrock) was formed from volcanic tuff deposits from the Makalapa and/or Āliamanu events. The stratigraphy conformed to the USDA soil survey designation of Rock land (rRK).

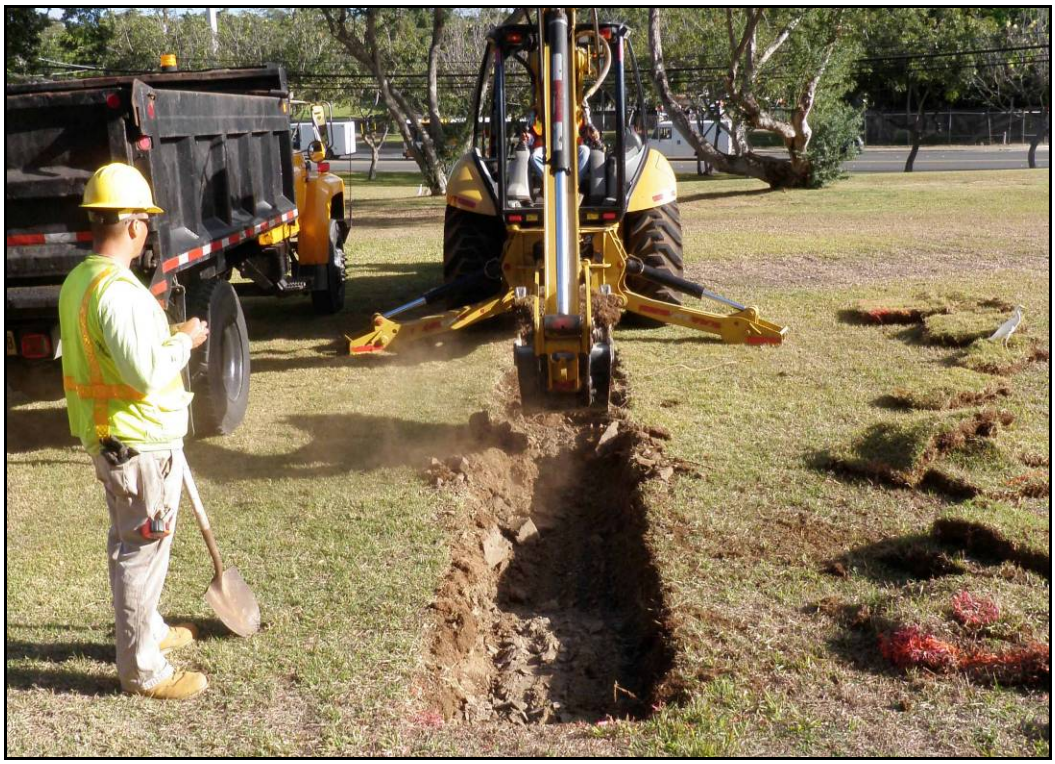
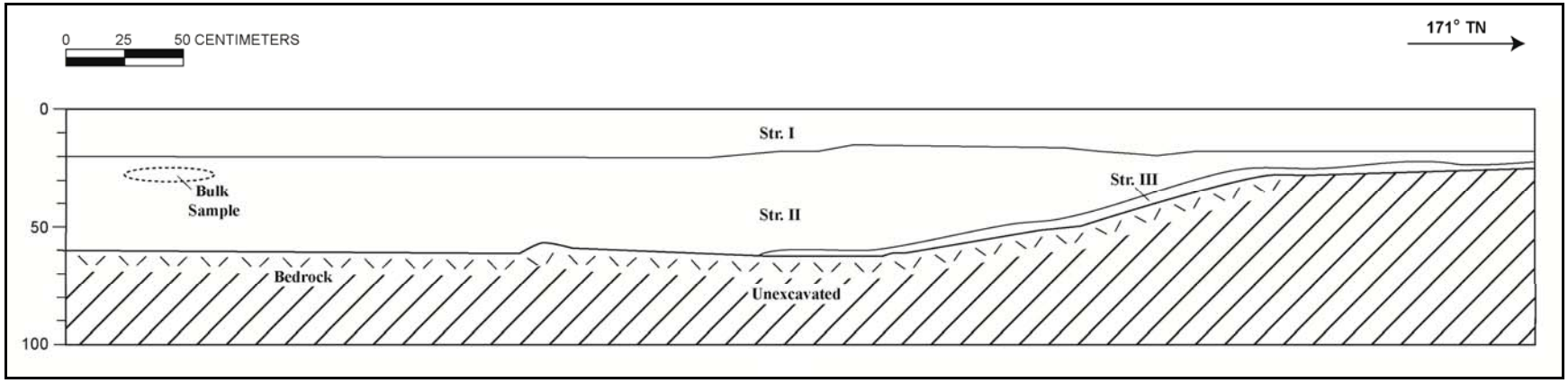


Figure 136. Photograph of Airport Section 3, T-010, general location, Radford Drive in background, view to north

Figure 137. Photograph of Airport Section 3, T-010, east wall profile, view to east



Stratum	Depth (cmbs)	Description
I	0-20	Fill; clay loam; 7.5YR 4/2 (brown); weak, fine crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; fine roots common; imported topsoil with fertilizer
II	15-55	Natural; extremely gravelly sand; 2.5Y 5/3 (light olive brown); weak, fine, crumb structure; dry, hard consistency; non-plastic; terrigenous origin; diffuse, wavy lower boundary; many fine roots; contains basalt gravel, four highly oxidized metal nail fragments, two fragments of *Pinctada radiata* and an unidentified bivalve; remnant former land surface (A-horizon)
III	20-59	Natural; volcanic tuff bedrock

Figure 138. T-010 east profile and stratigraphic description

Artifact Discussion: Four highly oxidized metal fragments, possibly nails, were collected from Stratum II of T-010 at 0.26-0.30 mbs.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal material was observed. Fragments of *Pinctada radiata* (1.3 g) and an unidentified bivalve (0.7 g) were recovered from a 35-liter screened sample of Stratum II that was collected between 0.26-0.30 mbs. The presence of a total of only 2.0 g of shell material within the 35-liter sample indicates that, while cultural material is present within Stratum II, this material is extremely sparse and not indicative of a discernible activity area.

Lab Results: No additional laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-010 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-010 was excavated to bedrock at a maximum depth of 0.59 mbs. The stratigraphy of T-010 consisted of topsoil (Stratum I) over natural sediment (Strata II-III). The stratigraphy conformed to the USDA soil survey designation of Rock land (rRK). Corroded metal pieces and sparse shell material were observed in Stratum II. The material is not considered to be indicative of an activity area. No cultural resources were identified.

7.2.11 Test Excavation 11 (T-011)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002:004
Street:	Kamehameha Highway (*mauka* or east of highway)
Owner:	Federal Government
Elevation:	8.85 m
UTM:	610426.2209 mE, 2361488.626 mN
Max Length/Width/Depth:	6.1 m/0.8 m/0.50 m
Orientation:	81°/261° TN
Targeted Project Component:	Pearl Harbor Naval Base Station (proposed escalator pit)
USDA Soil Designation:	Rock land (rRk)

Setting: Test Excavation 11 (T-011) was located at the base of an outcrop ledge in a field less than 18 m east of Kamehameha Highway and about 72 m south of Radford Drive (see Figure 43 and Figure 126; Figure 139). The excavation area was relatively level with the surrounding land surface. A large exposed bedrock slope was identified about 8 m south of T-011.

Summary of Background Research and Land Use: T-011 and nearby T-007, T-008, T-009, and T-010 were all located in the vicinity of the Pearl Harbor Naval Base Station footprint (see Figure 126). This location is in a soil swale between two easterly extending ridges of the Āliamanu and Makalapa Craters. The 1873 Lyons map of Pearl Lochs shows what appears to be a small unnamed rivulet in this swale flowing into the small Wailolowai Fishpond at the Southeast Loch of Pearl Harbor (see Figure 94). A north-south trending trail is also shown in this immediate area. A 1933 U.S. Army War Department Fire Control quad map shows an irrigation ditch descending from a reservoir located 500 m to the east, passing directly south of the Pearl Harbor Naval Base Station location and bifurcating to the west with both ditches descending in a generally southwesterly direction (see Figure 101). This area appears to have been a part of Honolulu Plantation sugar cane “Field 1” by 1935 (see Figure 103). A 1943 U.S. Army War Department Aiea quad map shows substantial housing development adjacent to the southwest and east of the Pearl Harbor Naval Base Station footprint (see Figure 105).

Documentation Limitations: T-011 was excavated to bedrock at a maximum depth of 0.50 mbs. T-011 was shifted west to avoid a possible utility (see station layout map). There were no specific factors that limited documentation of T-011.

Stratigraphic Summary: The stratigraphy of T-011 consisted of topsoil over natural sediment (Figure 140 and Figure 141). Observed strata were imported topsoil fill (Stratum I) overlying natural extremely gravelly silt (Stratum II) and volcanic tuff bedrock (Stratum III). Stratum II is considered to be a possible former land surface (A-horizon) that has been truncated horizontally and leveled. Stratum III was formed from volcanic tuff from the Makalapa and/or Āliamanu events. The stratigraphy conformed to the USDA soil survey designation of Rock land (rRK).

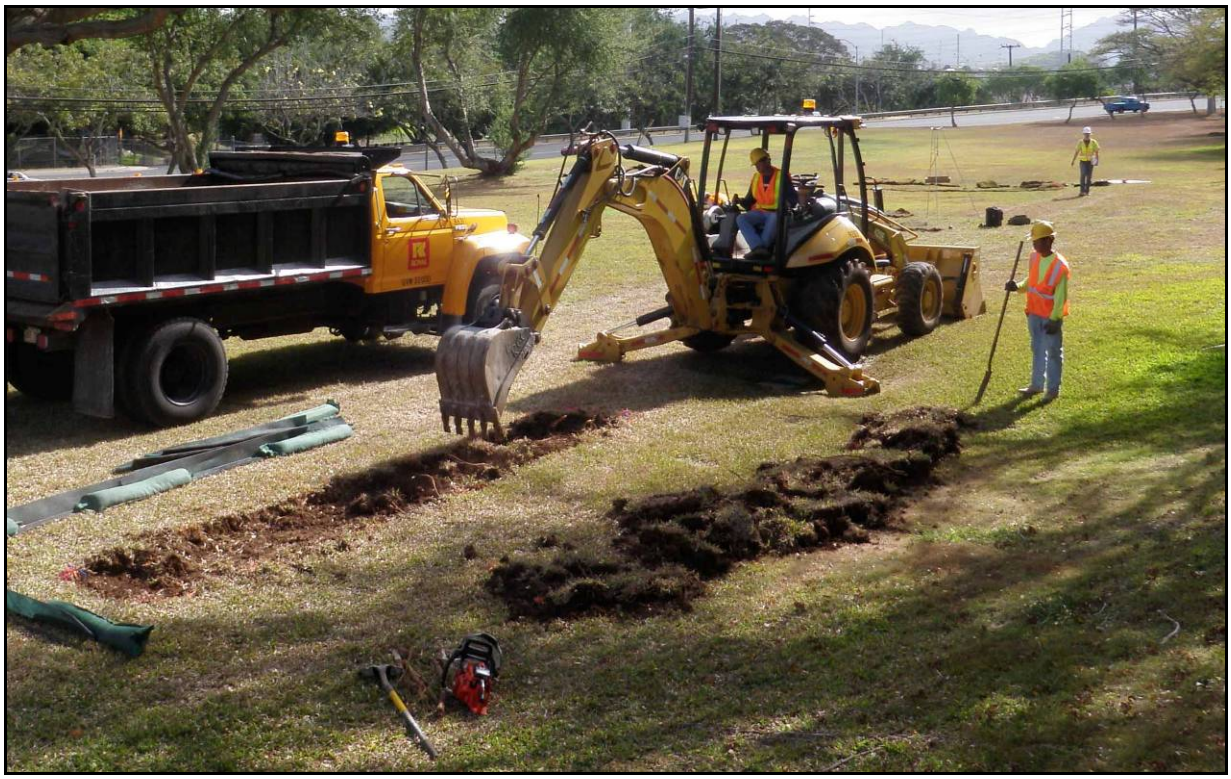
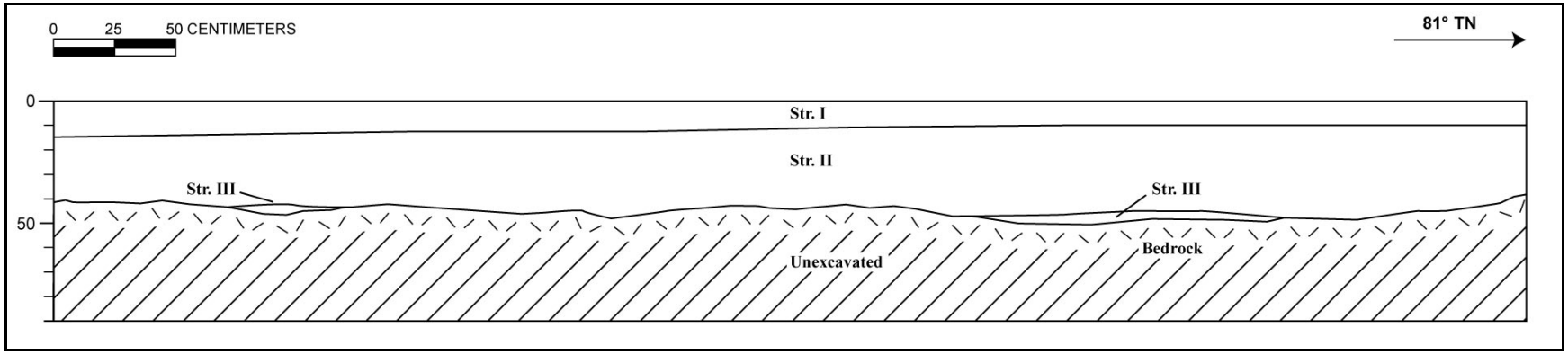


Figure 139. Photograph of Airport Section 3, T-011, general location; T-008, T-010, and Radford Drive in background, view to northeast

Figure 140. Photograph of Airport Section 3, T-011, north wall profile, view to north



Stratum	Depth (cmbs)	Description
I	0-15	Fill; clay loam; 7.5YR 3/4 (dark brown); weak, fine structure; moist, very friable consistency; plastic; abrupt, smooth lower boundary; imported topsoil fill with grass
II	12-48	Natural; extremely gravelly silt; 2.5Y 5/3 (light olive brown); weak, fine, crumb structure; dry, hard consistency; non-plastic; terrigenous origin; diffuse, wavy lower boundary; few fine roots; remnant former land surface (A-horizon)
III	43-50	Natural; volcanic tuff bedrock

Figure 141. T-011 north profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude GPR slice maps revealed no linear features that might have suggested the presence of utilities (See Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-011 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-011 was excavated to bedrock at a maximum depth of 0.50 mbs. The stratigraphy of T-011 consisted of topsoil (Stratum I) over natural sediment (Strata II-III). The stratigraphy conformed to the USDA soil survey designation of Rock land (rRK). No cultural resources were identified in T-011.

7.2.12 Test Excavation 12 (T-012)

***Ahupua‘a*:**	Hālawa
LCA:	Ali‘i Award 8516B & 7712 (to Grace Kama‘iku‘i Young Rooke and Kekūanaō‘a)
TMK #:	9-9-002 [Plat]
Street:	Kamehameha Highway
Owner:	State DOT Airports Division
Elevation:	14.0 m
UTM:	610447.5896 mE, 2361207.381 mN
Max Length/Width/Depth	3.04 m/1.28 m/0.78 m
Orientation:	159°/339° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 12 (T-012) was located in the median of Kamehameha Highway about 40 m north of the intersection with Center Drive (see Figure 44; Figure 142). The excavation area was relatively level with the surrounding surface.

Summary of Background Research and Land Use: T-012 is located in the Hālawa Ahupua‘a of the ‘Ewa district just north of the boundary with Moanalua Ahupua‘a of Kona District. Early maps indicate little activity in this area. According to the Honolulu Plantation Company field map circa 1935, the area was part of sugar cane “Field 2” (see Figure 103). A 1943 U.S. Army War Department Aiea quad map shows substantial housing development adjacent to the west and east of T-012 (see Figure 105).

Documentation Limitations: T-012 was excavated to bedrock at a maximum depth of 0.78 mbs. A utility line was encountered along the western side of the excavation area.

Stratigraphic Summary: The stratigraphy of T-012 consisted of fill strata over bedrock (Figure 143 and Figure 144). Observed strata were asphalt (Stratum Ia), crushed coral base course (Stratum Ib), and extremely gravelly silt loam fill (Stratum Ic) overlying volcanic tuff bedrock (Stratum II). A surface exposure of volcanic tuff, likely deposited by Makalapa Crater, was observed in an adjacent road cut. The stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB) for this location.

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

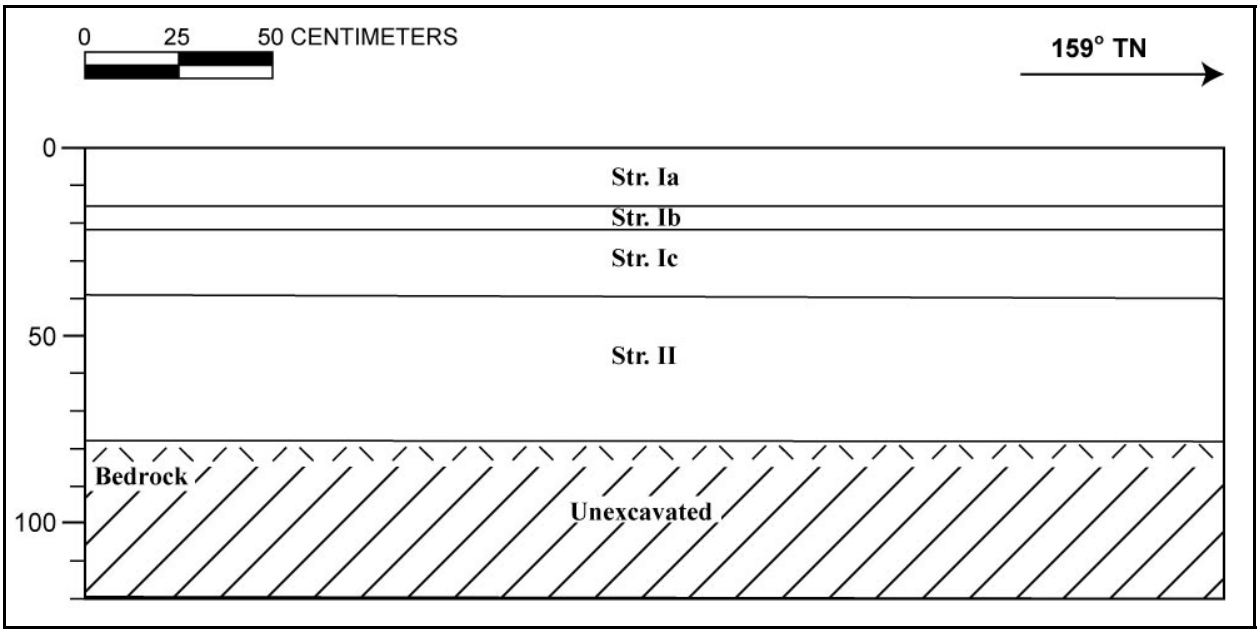
Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of GPR amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively

Figure 142. Photograph of Airport Section 3, T-012, general location, view to north

Figure 143. Photograph of Airport Section 3, T-012, general view of profile, view to west



Stratum	Depth (cmbs)	Description
Ia	0-15	Asphalt
Ib	15-21	Fill; extremely gravelly sand; 10YR 8/3 (very pale brown); structureless, single-grain; dry, loose consistency; non-plastic; marine origin; very abrupt, smooth lower boundary; crushed coral base course
Ic	21-39	Fill; extremely gravelly silt loam; 7.5YR 5/4 (brown); structureless, single-grain; dry, loose consistency; non-plastic; mixed origin; very abrupt, smooth lower boundary; contained basalt gravel
II	39-78	Natural; volcanic tuff bedrock

Figure 144. T-012 west profile and stratigraphic description

uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-012 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 0.75 mbs.

Summary: T-012 was excavated to bedrock at a maximum depth of 0.78 mbs. The stratigraphy of T-012 consisted of fill (Strata Ia-Ic) over volcanic tuff bedrock (Strata II). The stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB). No cultural resources were identified in T-012.

7.2.13 Test Excavation 13 (T-013)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-010 [Plat]
Street:	Makai Frontage Road
Owner:	State DOT Airports Division
Elevation:	18.5 m
UTM:	610485.8091 mE, 2361005.914 mN
Max Length/Width/Depth	3.0 m/1.0 m/1.95 m
Orientation:	156°/336° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 13 (T-013) was located in the median between Makai Frontage Road and the southbound Kamehameha ramp to Nimitz Highway, or “Ramp KN” (see Figure 45; Figure 145). The location is about 145 m south of the intersection with Center Drive. The excavation area was level with the surrounding surface.

Summary of Background Research and Land Use: T-013 was located within Moanalua Ahupua‘a, just south of Hālawa Ahupua‘a. Early maps indicate little activity in this area. According to the Honolulu Plantation Company field map circa 1935, the area was part of sugar cane “Field 2” (see Figure 103). The 1943 U.S. War Department Aiea quadrangle map shows substantial housing development southwest of T-013 (see Figure 105).

Documentation Limitations: T-013 was excavated to bedrock at a maximum depth of 1.95 mbs. The excavation area was offset slightly from its original location in order to avoid disturbance to tree root systems. The excavation was limited due to a tree root encountered at the southeast end of T-013. A PVC line was observed at the northwest end but, it did not limit the excavation.

Stratigraphic Summary: The stratigraphy at T-013 consisted of fill over basalt bedrock (Figure 146 and Figure 147). Observed strata were silt loam topsoil (Stratum Ia) and extremely cobbly sandy loam (Stratum Ib) overlying natural basalt bedrock (Stratum II). The natural bedrock (Stratum II) was encountered at 1.85 mbs. The stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

Figure 145. Photograph of Airport Section 3, T-013, general location, view to southeast

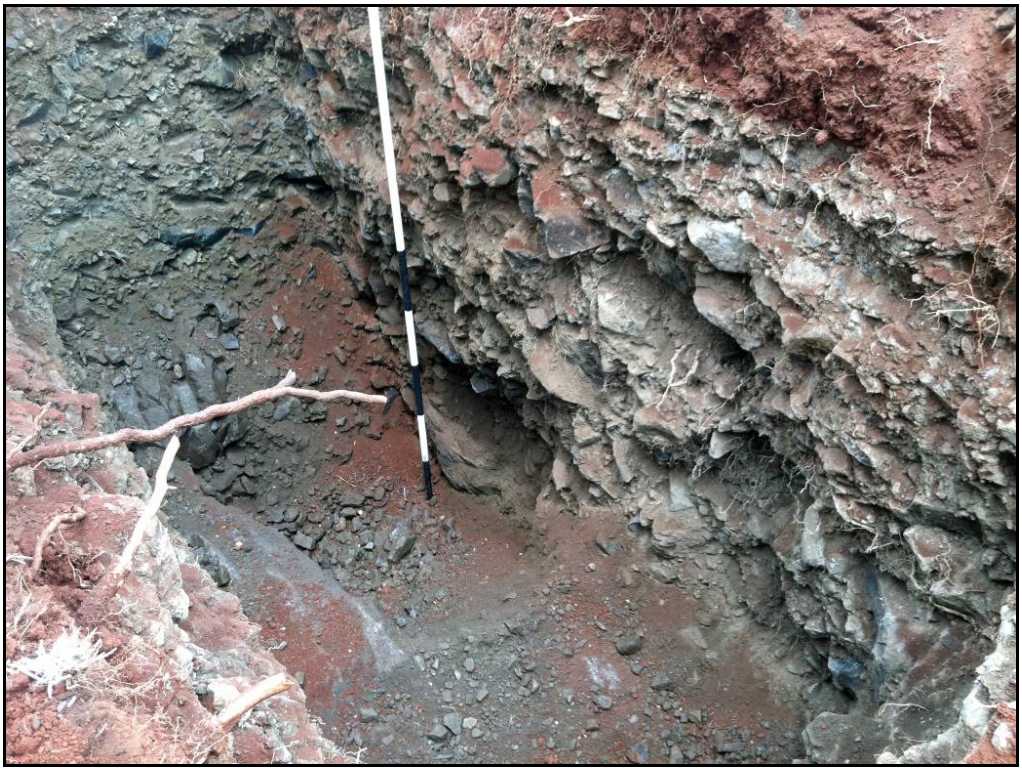
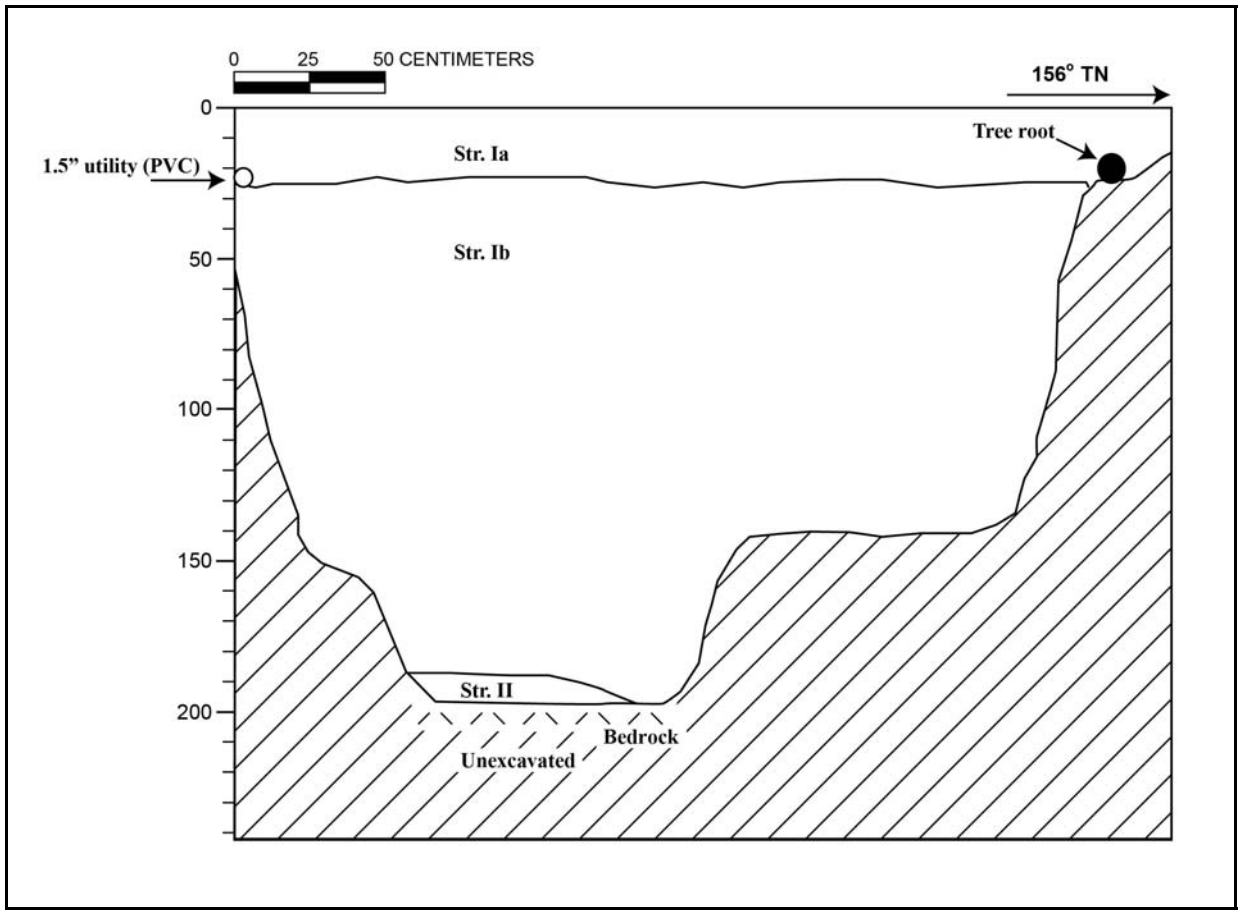


Figure 146. Photograph of Airport Section 3, T-013, east wall profile, view to east



Stratum	Depth (cmbs)	Description
Ia	0-25	Fill; silty loam; 2.5YR 3/6 (dark red); weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine to medium roots; topsoil
Ib	25-195	Fill; extremely cobbly sandy loam; 10YR 4/2 (dark grayish brown); weak, fine, blocky structure; moist, loose consistency; slightly plastic; terrigenous origin; irregular lower boundary; medium to coarse roots common; basalt cobble/boulder fill
II	185-195	Natural; basalt bedrock

Figure 147. T-013 east profile and stratigraphic description

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility and tree root were encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25- 0.50 mbs.

GPR depth profiles for T-013 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.35 mbs. Two anomalies were indicated on the GPR profile which corresponded to the tree root and utility encountered during excavation. The maximum depth of clean signal return was about 1.0mbs.

Summary: T-013 was excavated to bedrock at a depth of 1.95 mbs. The stratigraphy consisted of fill (Strata Ia-Ib) overlying natural bedrock (Stratum II). The stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB) for this location. No cultural resources were identified in T-013.

7.2.14 Test Excavation 14 (T-014)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-010 [Plat]
Street:	Between H-1 Freeway (east or *mauka*) and Makai Frontage Road (west or *makai*)
Owner:	State DOT Airports Division
Elevation:	15.5 m
UTM:	610605.1409 mE, 2360580.243 mN
Max Length/Width/Depth	4.1 m/1.1 m/2.90 m
Orientation:	$70^{o}/250^{o}$ TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 14 (T-014) was located within the grassy median between Makai Frontage Road and the H-1 Freeway, east bound to the Honolulu International Airport (see Figure 46; Figure 148). The median surface is slightly inclined to the west.

Summary of Background Research and Land Use: Early maps indicate that the surrounding area of T-014 was undeveloped. The 1899 Beasley map shows the OR&L in the immediate vicinity (see Figure 97). According to the Honolulu Plantation map circa 1935, T-014 is located in an area of sugar cane production (see Figure 103). By 1943, there was substantial development of the Hickam Air Force Base to the south, but the immediate vicinity of T-014 was still relatively undeveloped (see Figure 105).

Documentation Limitations: T-014 was excavated to a depth of 2.90 mbs. The base of excavation was limited by the maximum reach of the backhoe. T-014 was rotated from the original location to avoid impact to subsurface tree root systems.

Stratigraphic Summary: The stratigraphy at T-014 consisted of fill strata to the base of excavation (Figure 149 and Figure 150). Observed strata were loam fill (Stratum Ia), extremely gravelly cobbly loam fill (Stratum Ib), and gravelly cobbly sandy loam fill (Stratum Ic). The stratigraphy observed within T-014 did not conform to the USDA soil survey designation of Makalapa clay (MdB) for this location.

Artifact Discussion: No artifacts were observed.

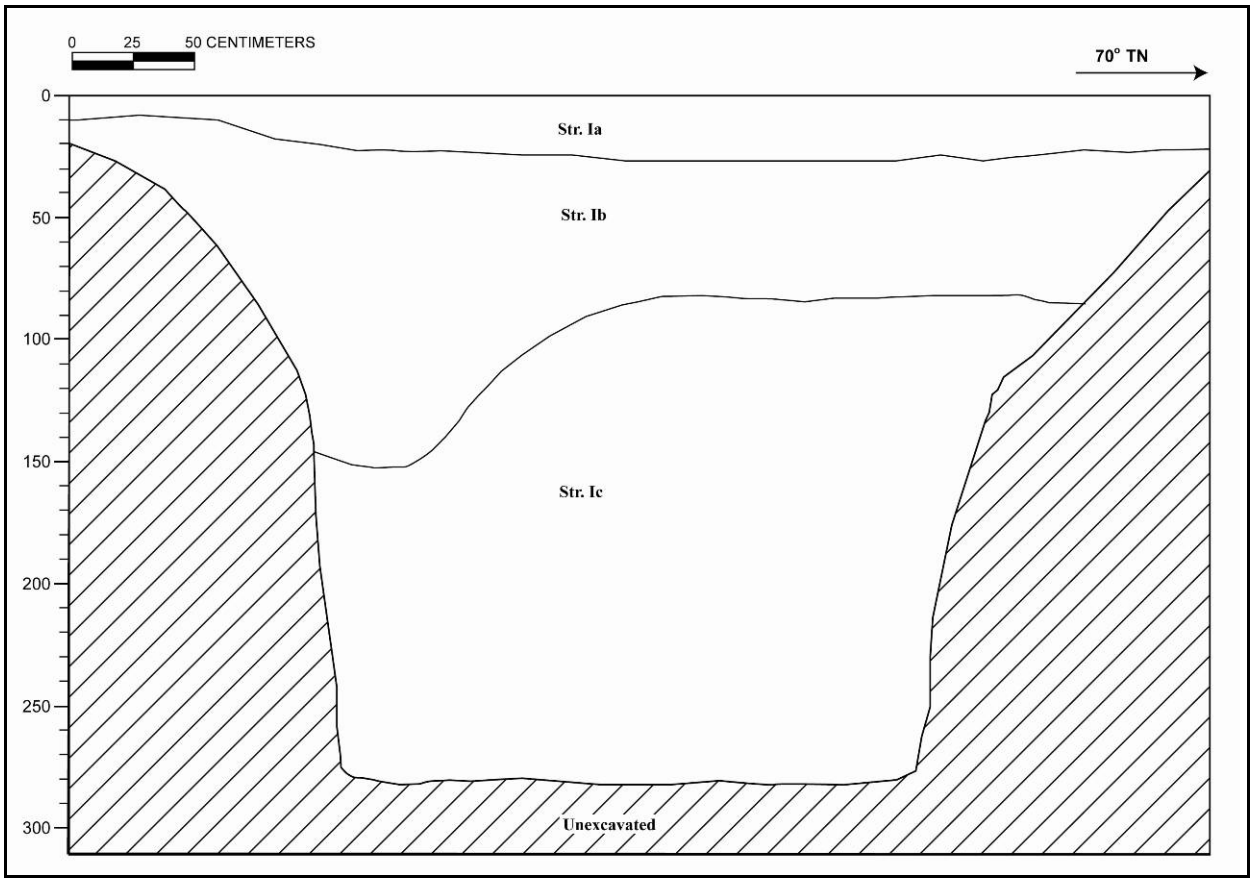
Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

Figure 148. Photograph of Airport Section 3, T-014, general location, view to south

Figure 149. Photograph of Airport Section 3, T-014, north wall profile, view to northeast



Stratum	Depth (cmbs)	Description
Ia	0-22	Fill; loam; 5YR 3/4 (reddish brown); weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; medium to coarse roots common
Ib	10-150	Fill; gravelly cobbly loam; 5YR 3/3 (dark reddish brown); weak, medium, blocky structure; friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; few fine to medium roots; contained coral, angular basalt, asphalt, one concrete block
Ic	83-290	Fill; gravelly cobbly sandy loam; 5YR 4/3 (reddish brown); weak, fine, blocky structure; moist, friable consistency; non-plastic; mixed origin; lower boundary not visible; few fine roots; contained basalt and coral cobbles, asphalt, and angular cobbles

Figure 150. T-014 north profile and stratigraphic description

GPR Discussion: A review of amplitude slice maps revealed no linear features that might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs and increased again at 0.75 mbs.

GPR depth profiles for T-014 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring about at 0.25 mbs and again around 0.60 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-014 was excavated to a maximum depth 2.90 mbs. The stratigraphy of T-014 consisted of fill (Strata Ia-Ic) to the base of excavation. The stratigraphy observed did not conform to the USDA soil survey designation of Makalapa clay (MdB). No cultural resources were identified.

7.2.15 Test Excavation 15 (T-015)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-010 [Plat]
Street:	Between H-1 Freeway (east or *mauka*) and Makai Frontage Road (west or *makai*)
Owner:	State DOT Airports Division
Elevation:	13.25 m
UTM:	610677.4605 mE, 2360435.320 mN
Max Length/Width/Depth	3.04 m/1.10 m/2.90 m
Orientation:	314°/134° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 15 (T-015) was located in the grassy median between the H-1 Freeway and Makai Frontage Road, directly north of the Nimitz to H-1 westbound on-ramp (see Figure 47; Figure 151).

Summary of Background Research and Land Use: The location around T-015 was largely undeveloped pasture land until the creation of the OR&L in the late 1800s (see Figure 97). By the 1900s the railway allowed the development of agriculture in the area, primarily for sugar cane. T-015 appears to be located within sugar cane "Field 10" of the former Honolulu Plantation (see Figure 103). Military development of the area occurred during the 1930s-1940s (see Figure 105).

Documentation Limitations: T-015 was excavated to a maximum depth of 2.90 mbs. The base of excavation was limited by a buried asphalt surface (designated SIHP # 50-80-13-7420 Feature 1) encountered at 2.86 mbs. The excavation of T-015 also was limited by both the maximum reach of the backhoe and safety protocols.

Stratigraphic Summary: The stratigraphy consisted of fill strata overlying buried asphalt (Figure 152 and Figure 153). Observed strata were sandy silt topsoil (Stratum Ia), sandy clay loam fill (Stratum Ib), very gravelly sandy silt fill (Stratum Ic), very stony sandy silt fill (Stratum Id), and buried asphalt (Stratum II). The buried asphalt was determined to be a cultural resource and was designated as SIHP # 50-80-13-7420 Feature 1. The observed stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB) for this location.

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7420 Feature 1, was encountered within T-015, at the base of excavation and extending beyond the boundaries of the excavation area. Feature 1 was interpreted as a historic asphalt pavement possibly associated with an early road alignment pre-dating Kamehameha Highway.

Figure 151. Photograph of Airport Section 3, T-015, general location, view to west

Figure 152. Photograph of Airport Section 3, T-015, general view of profile, view to northwest

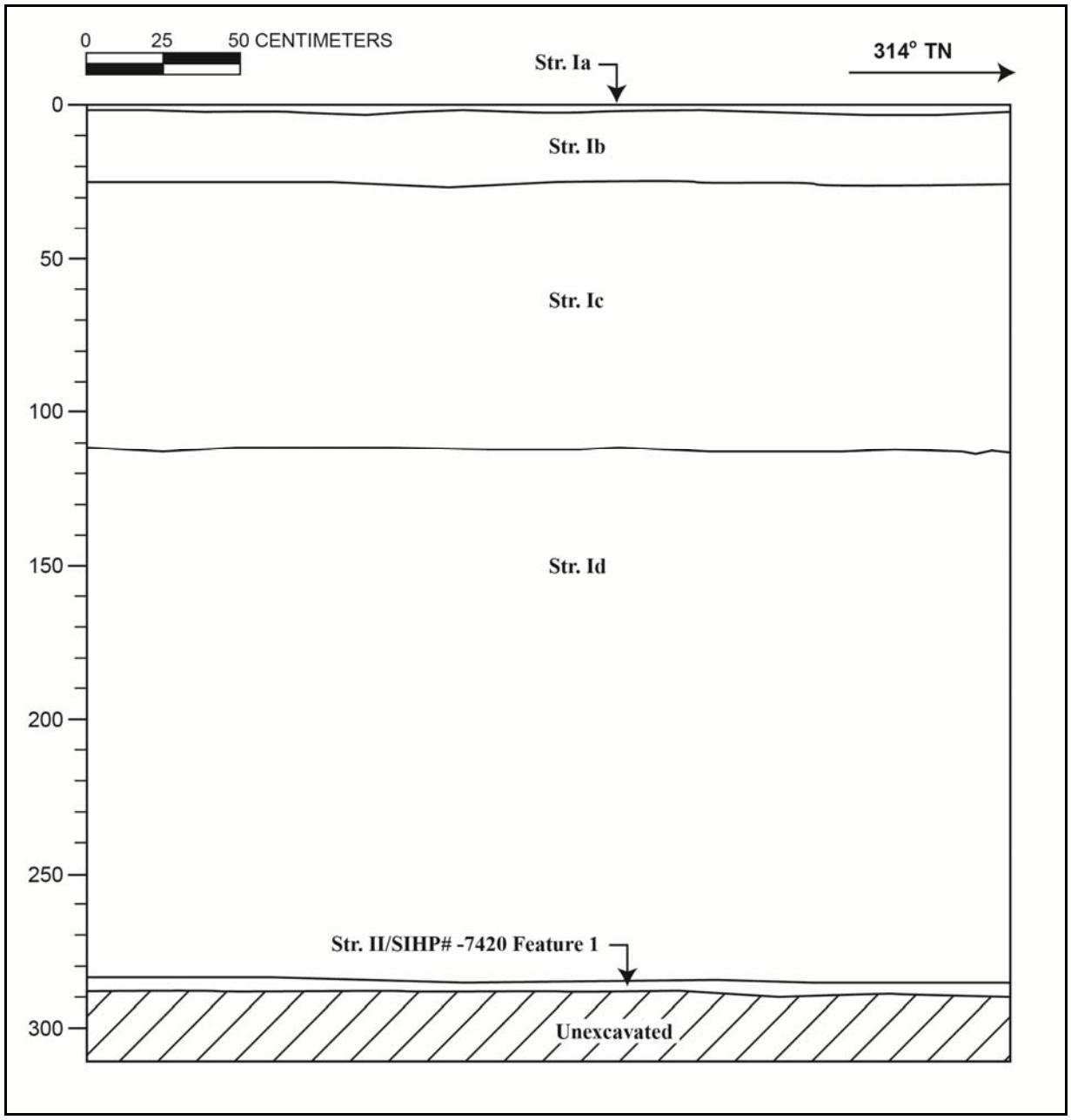


Figure 153. T-015 west profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-2	Fill; sandy silt; 10YR 2/2 (dark brown); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; many very fine to fine roots; topsoil
Ib	2-26	Fill; sandy clay loam; 2.5YR 3/6 (dark red); weak, fine, blocky structure; moist, friable consistency; slightly plastic; terrigenous; abrupt, smooth lower boundary; many very fine to coarse roots
Ic	26-114	Fill; extremely gravelly sandy silt; 10YR 4/3 (brown); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; very fine to fine roots common; gravels grading to cobbles and boulders with depth
Id	114-286	Fill; very stony sandy silt; 10YR 3/4 (dark yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; contains angular basalt cobbles and small boulders (about 50%) with loose sandy silt matrix
II	286-290	Buried asphalt; historic asphalt pavement possibly associated with road pre-dating Kamehameha Highway, SIHP # -7420 Feature 1

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was coducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features that might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-015 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring about at 0.25 mbs and again at about at 0.75 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-015 was excavated to a maximum depth of 2.90 mbs. The stratigraphy consisted of topsoil (Stratum Ia) and fill (Strata Ib-Id) overlying buried asphalt (Stratum II). The observed stratigraphy did not conform to the USDA soil survey designation of Makalapa clay (MdB) for this location. The buried asphalt surface was designated as SIHP # 50-80-13-7420 Feature 1 and interpreted as a historic asphalt pavement possibly associated with an early road alignment pre-dating Kamehameha Highway (see Section 7.4.2).

7.2.16 Test Excavation 16 (T-016)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-010 [Plat]
Street:	Between H-1 Freeway (east or *mauka*) and Makai Frontage Road (west or *makai*)
Owner:	State DOT Airports Division
Elevation:	19.5 m
UTM:	610802.6720 mE, 2360284.081 mN
Max Length/ Width/Depth	3.04 m/1.0 m/1.78 m
Orientation:	118°/298° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 16 (T-016) was located in a grassy median between the H-1 Freeway and the Ramp NE that appears to be artificially raised to the level of the freeway (see Figure 47; Figure 154).

Summary of Background Research and Land Use: The location around T-016 was largely undeveloped pasture land until the creation of the OR&L in the late 1800s (see Figure 97). By the 1900s the railway allowed the development of agriculture in the area, primarily for sugar cane (see Figure 97). T-016 appears to have been located within sugar cane “Field 10” of the former Honolulu Plantation (see Figure 103). Military development of the area occurred during the 1930s-1940s (see Figure 105).

Documentation Limitations: T-016 was excavated to a depth of 1.78 mbs. The deepest stratum encountered (Stratum Ie) contained large to massive boulders. The concern arose that removing them would cause the sidewalls of T-016 to collapse. Also, because T-016 was located next to an on-ramp, there was additional concern that further excavation might cause instability of the immediate vicinity. Thus, excavation was halted.

Stratigraphic Summary: The stratigraphy at T-16 consisted of fill to the base of excavation (Figure 155 and Figure 156). Observed strata were silt loam topsoil (Stratum Ia), extremely gravelly sand fill (Stratum Ib), extremely gravelly silt loam (Stratum Ic), extremely cobbly silt loam fill (Stratum Id), and extremely stony silt loam fill (Stratum Ie). No natural sediment was observed within T-016. The observed stratigraphy did not conform to the USDA soil designation of Makalapa clay (MdB).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

Figure 154. Photograph of Airport Section 3, T-016, general location, view to northwest

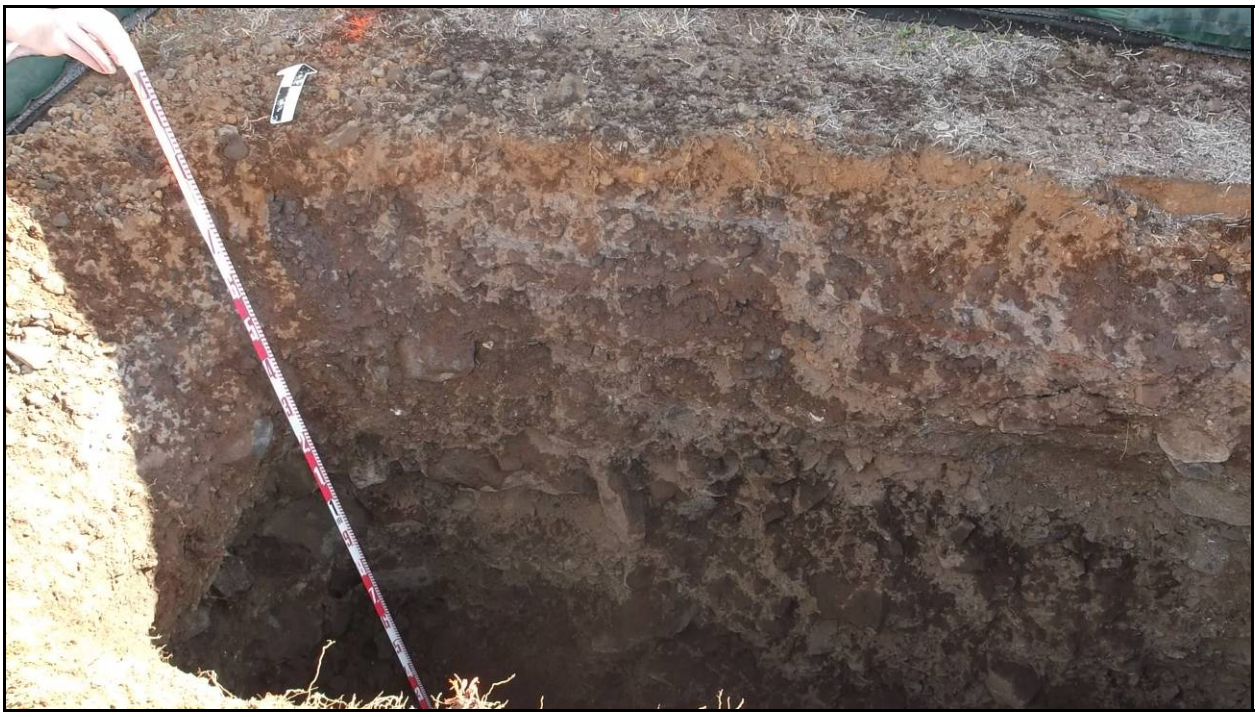
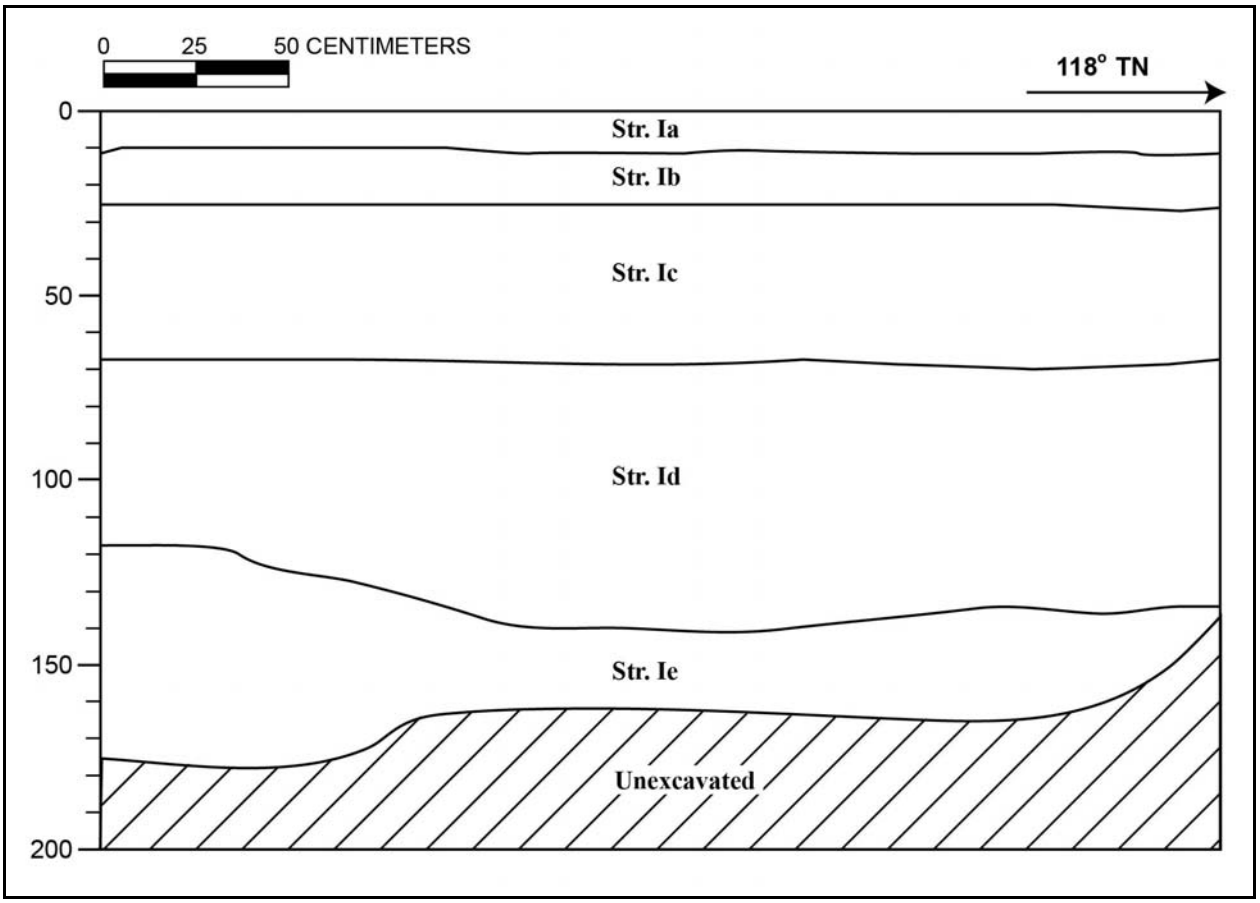


Figure 155. Photograph of Airport Section 3, T-016, north wall profile, view to north



Stratum	Depth (cmbs)	Description
Ia	0-10	Fill; silt loam; 10YR 4/6 (dark yellow brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; grass, topsoil
Ib	10-25	Fill; extremely gravelly sand; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; basalt gravel
Ic	25-70	Fill; extremely gravelly silt loam; 10YR 4/3 (brown); structureless, single-grain; dry, loose consistency; non-plastic; mixed origin; diffuse, smooth lower boundary; contains basalt gravel
Id	70-143	Fill; extremely cobbly silt loam; 10YR 4/3 (brown); structureless, single-grain; dry, loose consistency; non-plastic; mixed origin; clear; smooth lower boundary; contains basalt gravel and cobbles
Ie	128-178	Fill; extremely stony silt loam; 10YR 4/3 (brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; contains basalt boulders

Figure 156. T-016 north profile and stratigraphic description

GPR Discussion: A review of amplitude slice maps indicates no linear features that might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-016 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.00 mbs .

Summary: T-016 was excavated to a depth 1.78 mbs. The stratigraphy consisted of fill (Strata Ia-Ie) to the base of excavation. The observed stratigraphy did not conform to the USDA soil designation of Makalapa clay (MdB) for this location. No cultural resources were identified in T-016.

7.2.17 Test Excavation 17 (T-017)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-002:004
Street:	Nimitz Highway
Owner:	State DOT Airports Division
Elevation:	7.3 m
UTM:	611033.7784 mE, 2360099.667 mN
Max Length/Width/Depth	3.00 m/1.07 m/2.85 m
Orientation:	107°/287° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 17 (T-017) was located in a lawn area next to the sidewalk adjacent to Nimitz Highway, about 95 m east of the intersection with Valkenburgh Street (see Figure 48; Figure 157). The excavation area was level with the surrounding ground surface.

Summary of Background Research and Land Use: Until the creation of the OR&L in the late 1800s, the T-017 area was largely underdeveloped pasture land (see Figure 97). By the 1900s the railway allowed development of agriculture in the area, primarily sugar cane. T-017 appears to have been located within sugar cane “Field 10” of the former Honolulu Plantation (see Figure 103). This portion of the Airport Section 3 corridor extended through an area expected to have a low probability of cultural resources. Military development of the area occurred during the 1930s-1940s (see Figure 105).

Documentation Limitations: T-017 was excavated to a depth of 2.85 mbs. The base of excavation was determined by the maximum reach of the backhoe. There were no specific factors that limited the documentation of T-017.

Stratigraphic Summary: The stratigraphy at T-017 consisted of fill strata over a former asphalt road surface, associated base course and natural sediment (Figure 158 and Figure 159). Observed strata were landscaping topsoil (Stratum Ia), gravelly sandy loam fill (Stratum Ib), gravelly clay loam fill (Stratum Ic), and a buried asphalt pavement and concrete curbing (Stratum IIa), crushed coral base course (Stratum IIb) overlying natural clay loam (Stratum III) and volcanic tuff (Stratum IV). Strata IIa and IIb were designated as SIHP # 50-80-13-7420 Feature 2 (see below). The stratigraphy conformed to the USDA soil survey designation of Makalapa clay (MdB) for this location.

Artifact Discussion: No artifacts were observed.

Feature Discussion: The buried asphalt pavement (Stratum IIa) and associated crushed coral base course (Stratum IIb) were designated as SIHP # 50-80-13-7420 Feature 2. The buried asphalt and base course extended beyond the limits of the excavation area. Strata IIa and IIb were interpreted as a former mid-twentieth century road (see Section 7.4.2 below).

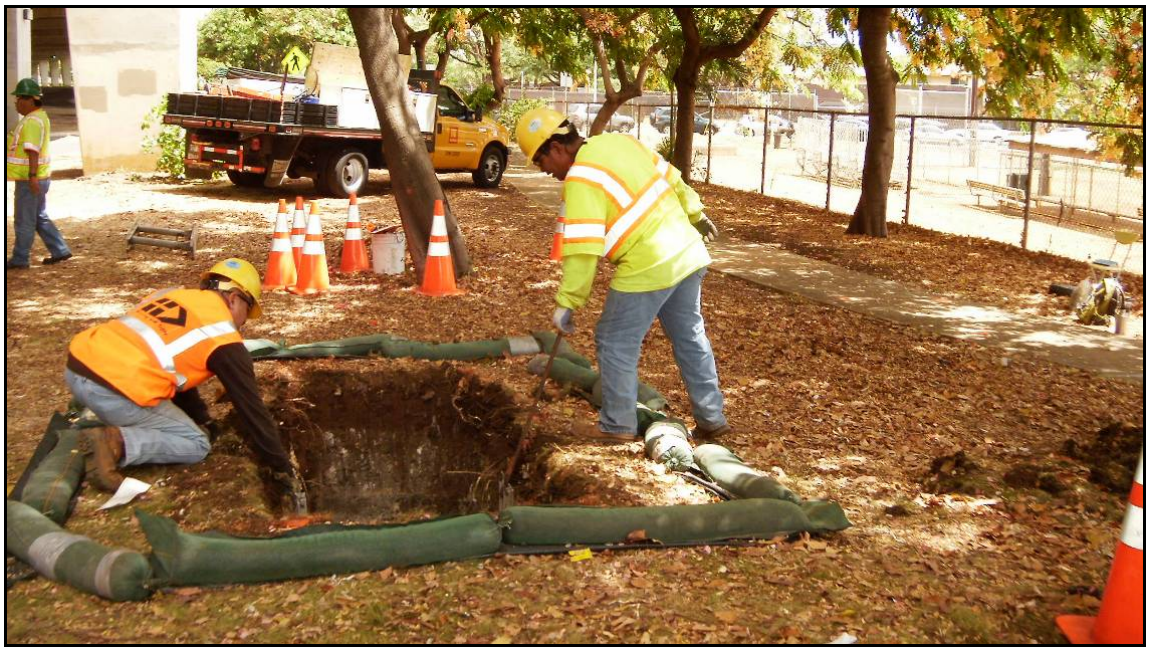


Figure 157. Photograph of Airport Section 3, T-017, general location, view to southeast

Figure 158. Photograph of Airport Section 3, T-017, general view of profile, view to north

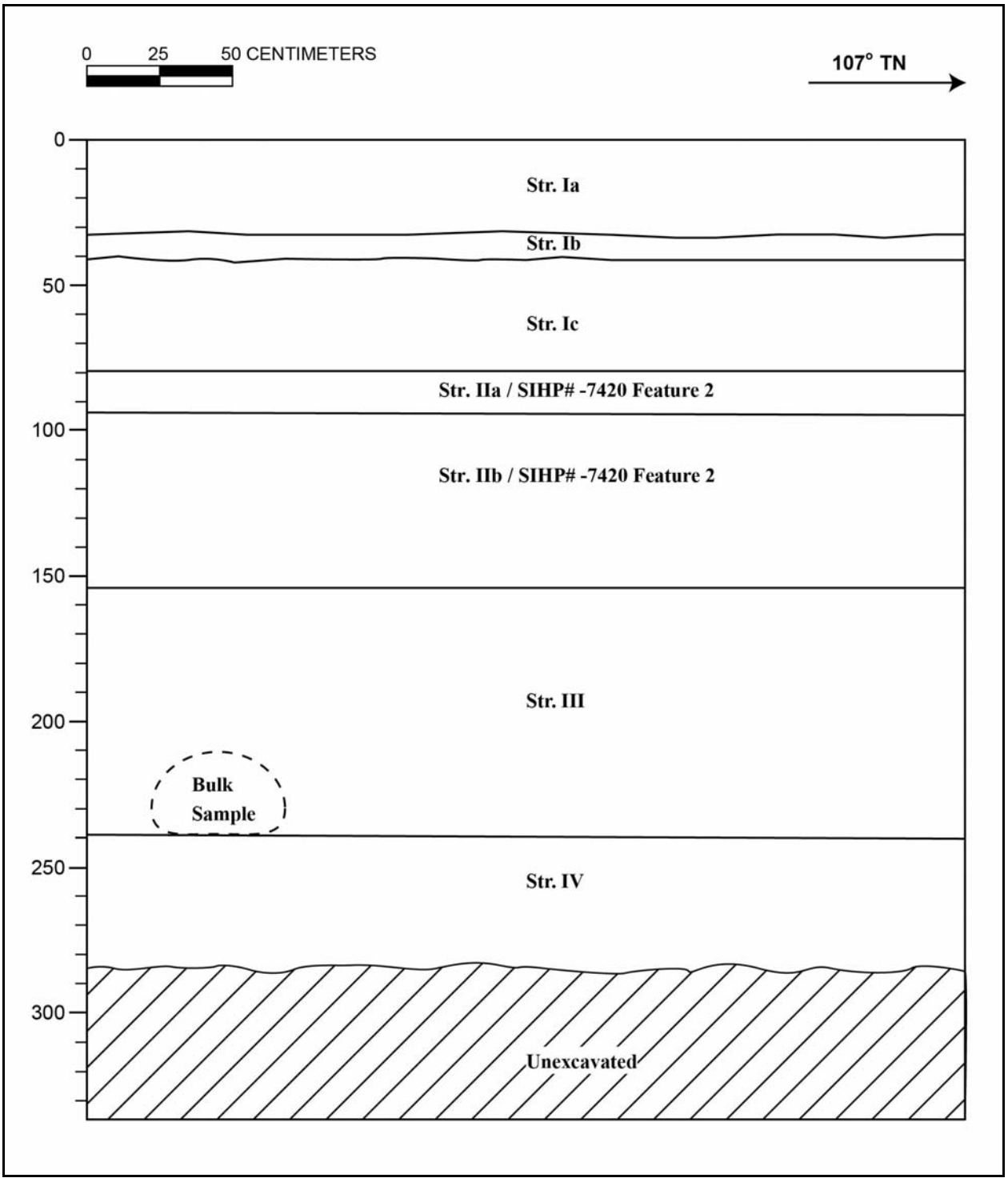


Figure 159. T-017 north profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-33	Fill; silty clay loam; 5YR 3/3 (dark reddish brown); weak, fine, blocky structure; moist, firm consistency; slightly plastic; terrigenous origin; very abrupt, smooth lower boundary; many medium to coarse roots; landscaped topsoil
Ib	33-42	Fill; gravelly sandy loam; 10YR 5/3 (brown) mottled with 50% coarse 10YR 8/1 (white); weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; coral gravel in sandy loam matrix
Ic	42-80	Fill; gravelly clay loam; 10YR 4/3 (brown) mottled with 50% coarse 10YR 4/1 (dark gray); weak, medium, blocky structure; moist, friable consistency; slightly plastic; very abrupt, smooth lower boundary; basalt and coral gravel in clay loam matrix
IIa	80-95	Asphalt pavement; historic asphalt pavement possibly associated with road pre-dating Kamehameha Highway, SIHP # -7420 Feature 2
IIb	95-155	Fill; sandy loam; 10YR 6/3 (pale brown) mottled with 50% fine to very coarse 10YR 8/1 (white); weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; smooth lower boundary; coral gravels and cobbles in sandy loam matrix; crushed coral base course for overlying asphalt pavement, SIHP # -7420 Feature 2
III	155-240	Natural; clay loam; 2.5YR 4/3 (olive brown); moderate, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; diffuse, smooth lower boundary; few medium roots; Makalapa clay (MdB)
IV	240-285	Natural; volcanic tuff; 10YR 3/2 (very dark gray brown) mottled with 25% 10YR 8/1 (white); strong, medium-coarse, platy structure; dry, hard consistency; non-plastic; terrigenous origin; lower boundary not visible

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: An approximate 2 liter bulk sediment sample was collected from Stratum III between 2.15 mbs and 2.45 mbs. The results were negligible.

GPR Discussion: A review of amplitude slice maps indicated no linear features that might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreases with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-17 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicates a change in reflectivity occurring around 0.15 mbs and again around 0.80 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-017 was excavated to a depth of 2.85 mbs in natural sediment. The stratigraphy of T-017 consisted of fill (Strata Ia-Ic), over a former road surface of asphalt pavement (Stratum IIa) and associated base course (Stratum IIb), and natural sediments (Strata III-IV). The stratigraphy conformed to the USDA soil survey designation of Makalapa clay (MdB) for this location. Mid-twentieth century maps show development for military-related residential infrastructure, the asphalt road exposed during excavation may be associated with this development. The buried roadway (Strata IIa-IIb) has been designated SIHP # 50-80-13-7420 Feature 2 (see Section 7.4.2 for discussion of historic properties).

7.2.18 Test Excavation 18 (T-018)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-002:004
Street:	Nimitz Highway
Owner:	State DOT Airports Division
Elevation:	6.32 m
UTM:	611221.5905 mE, 2360024.716 mN
Max Length/Width/Depth	3.5 m/1.04 m/3.05 m
Orientation:	285°/105° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 18 (T-018) was located near Nimitz Highway, about 113 m east of Main Street and about 68 m west of Elliott Street (see Figure 49; Figure 160). The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Prior to the establishment of the OR&L railway in the late 1800s, the location of T-018 was largely undeveloped pasture land (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of agriculture in the area, primarily sugar cane (see Figure 97). T-018 was located on the boundary of sugar cane "Field 10" of the former Honolulu Plantation circa 1935 (see Figure 103). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the OR&L and Honolulu Plantation railway lines traversed directly through the vicinity of T-018 (see Figure 101. The 1943 U.S. Army War Department map shows military-related residential and military infrastructure development in the region which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-018 was excavated to volcanic tuff at 3.05 mbs. T-018 was not entered due to trench sidewall instability. Proper trench shoring could not be installed at the base of excavation. Therefore, documentation of the lower stratigraphy was limited as samples were collected via the bucket of the mechanical excavator.

Stratigraphic Summary: The stratigraphy consisted of fill strata over natural sediment (Figure 161 and Figure 162). Observed strata were topsoil fill (Stratum Ia), gravelly sandy loam fill (Stratum Ib), buried asphalt pavement (Stratum IIa), buried concrete curbing (Stratum IIb), and crushed coral base course (Stratum IIc) overlying natural clay (Stratum III) and volcanic tuff (Stratum IV). The stratigraphy conformed to the USDA soil designation of Makalapa clay (MdB) for this location.

Artifact Discussion: An isolated beer bottle was collected from Stratum IIc. The bottle was manufactured by the Regal Amber Brewing Co. in San Francisco, California in 1942 (see Section 8.1).

Figure 160. Photograph of Airport Section 3, T-018, general location, view to southwest

Figure 161. Photograph of Airport Section 3, T-018, general view of profile, view to southeast

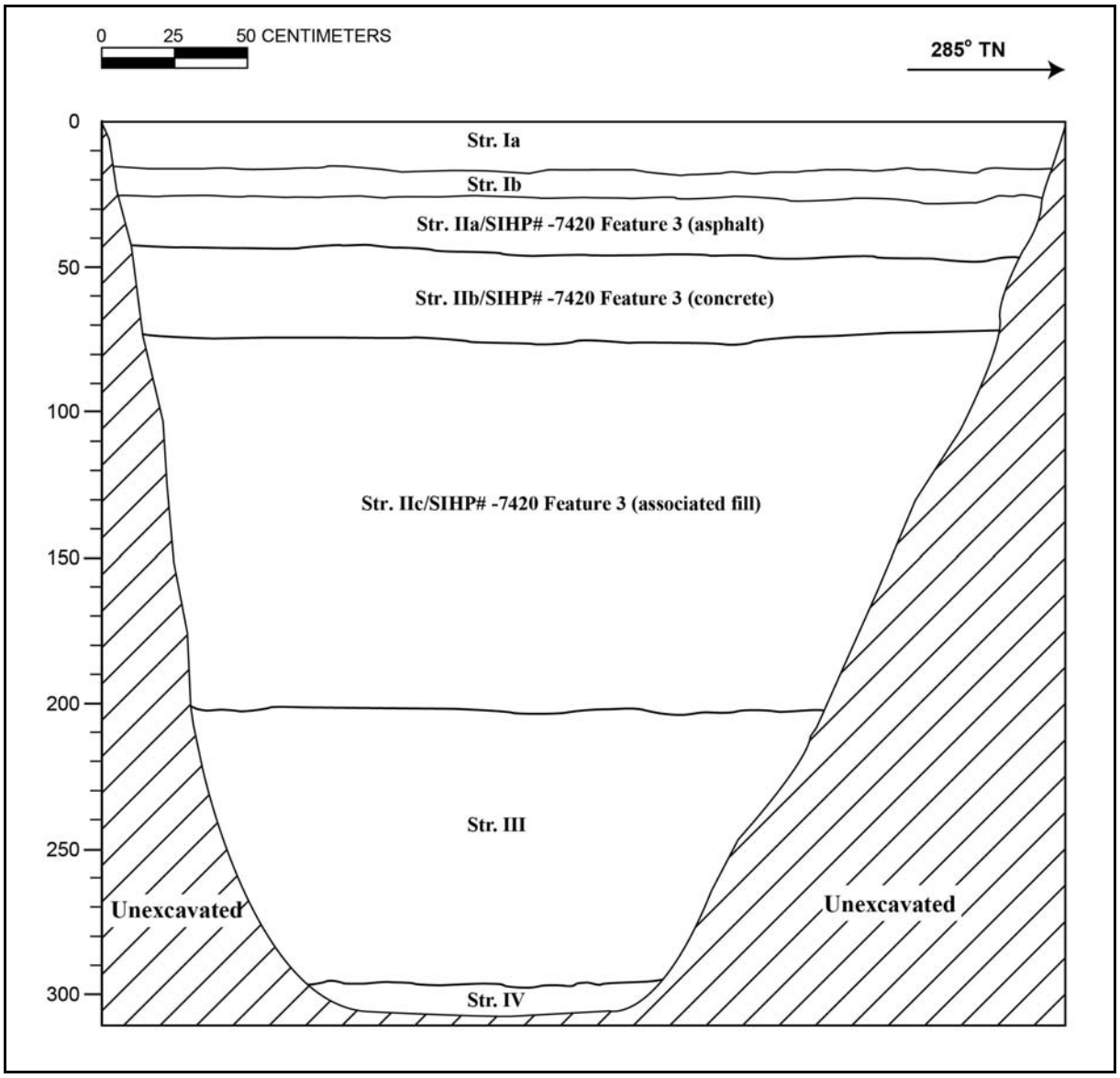


Figure 162. T-018 southwest profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-15	Fill; silty clay loam; 5YR 3/3 (dark reddish brown); weak, fine, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; clear, smooth lower boundary; many fine to coarse roots; contains leaves and other organic material, large root in southeast end; topsoil
Ib	15-25	Fill; gravelly sandy loam; 10YR 4/3 (brown); weak, medium to coarse crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; few fine to medium roots
IIa	25-45	Asphalt; very abrupt, smooth lower boundary; asphalt pavement; considered a component of SIHP # -7420 Feature 3
IIb	45-75	Concrete; very abrupt, smooth lower boundary; concrete slab rounded at upper edge – likely concrete curbing; considered a component of SIHP # -7420 Feature 3
IIc	75-200	Fill; very gravelly sandy loam; 10YR 6/3 (pale brown); weak, fine, medium, crumb structure; moist, very friable consistency; non-plastic; mixed origin; smooth lower boundary; contained a glass beer bottle; crushed coral base course; considered a component of SIHP # -7420 Feature 3
III	200-295	Natural; clay; 10YR 3/2 (very dark grayish brown); weak, medium to coarse, blocky structure; moist, firm consistency; plastic; terrigenous origin; smooth lower boundary; few very fine to fine roots; contains unidentified bivalve; Makalapa clay (MdB)
IV	295-305	Natural; volcanic tuff; 2.5YR 3/1 (very dark gray); strong, medium to coarse, platy structure; dry, slightly hard consistency; non-plastic; terrigenous origin

Feature Discussion: One feature (designated as SIHP # 50-80-13-7420 Feature 3) was identified within T-018. Feature 3 consists of Stratum IIa (buried asphalt pavement), Stratum IIb (buried concrete curbing), and Stratum IIc (associated fill). Feature 3 was interpreted as a buried mid-twentieth century roadway.

Faunal Remains Discussion: No osseous faunal remains were observed. A bivalve fragment (< 0.1 g) was identified in Stratum III at 2.40 mbs. This single marine shell is considered to be related to natural processes.

Lab Results: A 1 liter bulk sediment sample collected from Stratum III via the mechanical excavator bucket at 2.40 mbs yielded charcoal (< 0.1 g) and unidentified marine shell (< 0.1 g). A portion of the sample was submitted for pollen analysis (see Section 8.4.2). The pollen analysis identified high-spine Asteraceae pollen, representing an abundance of plants in the sunflower family growing locally throughout most of the sample. Additional pollen types indicated a tree and grass that grow in dry environments, including Cheno-am and Poaceae pollen. The total pollen concentration was moderately low at about 1260 pollen per cc of sediment. The results of laboratory analysis suggest a relatively dry habitat with no agricultural activity in the area.

GPR Discussion: A review of amplitude slice maps reflected no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-018 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring at about 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.60 mbs.

Summary: T-018 was excavated to volcanic tuff at 3.05 mbs. The stratigraphy consisted of fill (Strata Ia-Ib) overlying a former roadway (Strata IIa-IIc) designated SIHP # 50-80-13-7420 Feature 3, above natural clay (Stratum III) and volcanic tuff (Stratum IV). The stratigraphy generally conformed to the USDA soil designation of Makalapa clay (MdB) for this location. Feature 3, the buried roadway, consisted of asphalt (Stratum IIa), concrete (Stratum IIb) and crushed coral base course (Stratum IIc) and likely was associated with an alignment of a mid-twentieth century road (see Section 7.4.2). Stratum III contained charcoal and marine shell. Pollen analysis of the charcoal indicated a moderately low pollen concentration, which included Cheno-am and Poaceae pollen. The results of laboratory analysis suggested a relatively dry habitat with no agricultural activity in the area.

7.2.19 Test Excavation 19 (T-019)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Nimitz Highway
Owner:	State DOT Airports Division
Elevation:	7.44 m
UTM:	611501.1042 mE, 2359977.626 mN
Max Length/Width/Depth	3.00 m/1.00 m/2.90 m
Orientation:	294°/114° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 19 (T-019) was located in the landscaping along the southern (*makai*) side of Nimitz Highway and below the H-1 Freeway viaduct (see Figure 50; Figure 163). The location was about 185 m east of Elliott Street and north of the Honolulu International Airport Commuter Terminals. The excavation area was level with the surrounding surface.

Summary of Background Research and Land Use: Prior to the establishment of the OR&L railway in the late 1800s, the location of T-019 was largely undeveloped pasture land (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of agriculture in the area, primarily sugar cane. T-019 was located in sugar cane "Field 9" of the former Honolulu Plantation circa 1935 (see Figure 103). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the OR&L and Honolulu Plantation railway lines traversed directly through the vicinity of T-019 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and military infrastructure development in the region which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-019 was excavated to a depth of 2.9 mbs. There were no specific factors that limited excavation.

Stratigraphic Summary: The stratigraphy of T-019 consisted of fill strata over natural sediment (Figure 164 and Figure 165). Observed strata were topsoil fill (Stratum Ia), extremely gravelly loam fill (Stratum Ib), crushed coral fill (Stratum Ic), and crushed asphalt fill (Id) overlying natural clay (Stratum II). The stratigraphy conformed to the USDA soil survey designation of Makalapa clay (MdB) for this location.

Artifact Discussion: Two railroad spikes and decomposed wood (possibly from a railroad tie) were observed, but not collected from Stratum Ic. The displaced artifacts are likely related to the former nearby OR&L railroad alignment.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Figure 163. Photograph of Airport Section 3, T-019, general location, view to northwest

Figure 164. Photograph of Airport Section 3, T-019, general view of profile, view to northwest

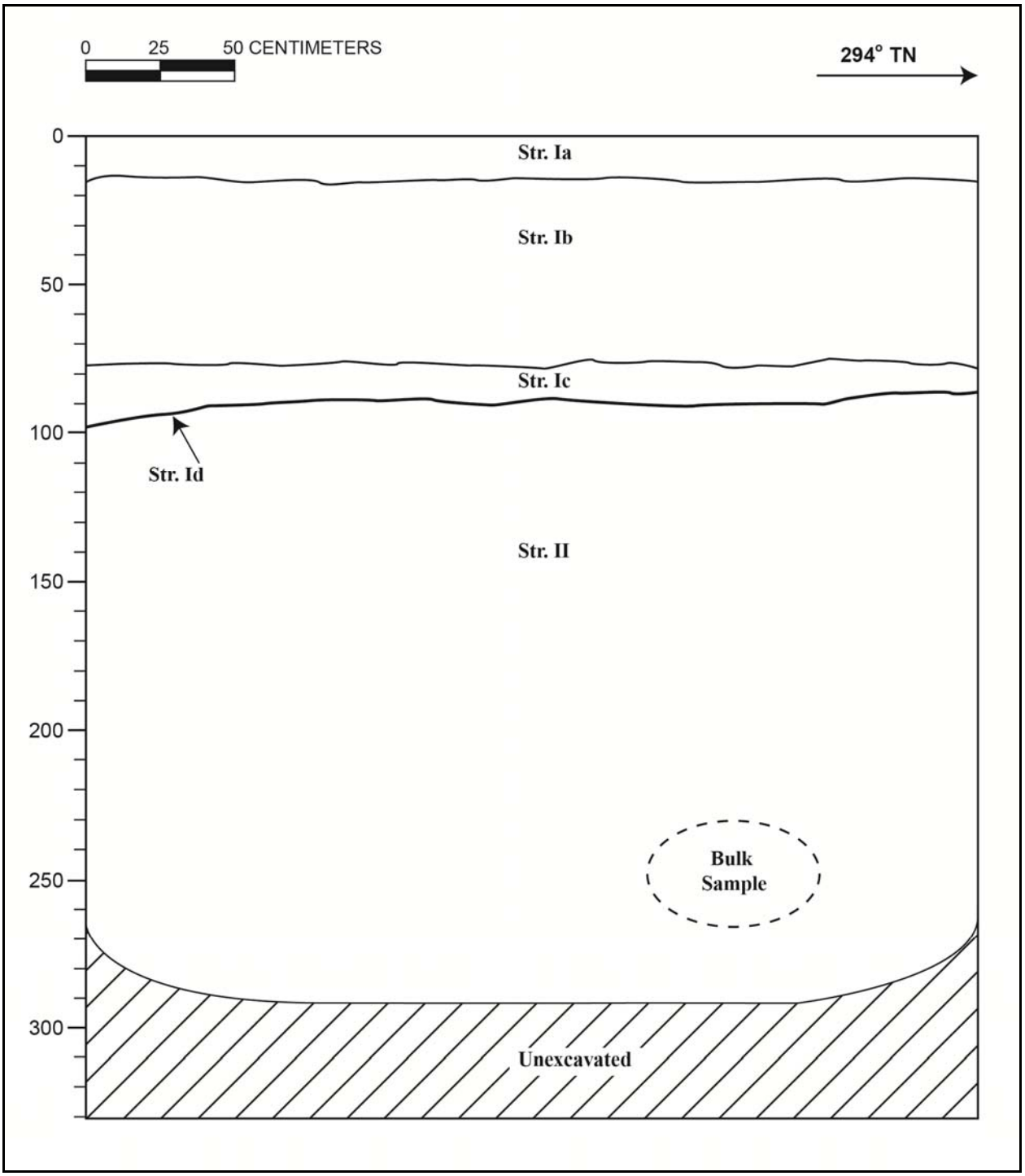


Figure 165. T-019 southwest profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-13	Fill; silty clay loam; 2.5YR 3/4 (very dark reddish brown); weak, fine, granular structure; moist, friable consistency; slightly plastic; terrigenous origin; smooth lower boundary; fine roots common; top soil
Ib	13-76	Fill; extremely gravely loam; 10YR 3/1 (very dark gray); weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary, few fine roots; gravel base coarse
Ic	76-98	Fill; sandy loam; 10YR 7/3 (very pale brown); weak, fine to medium, crumb structure; moist, loose consistency; mixed origin; abrupt, smooth lower boundary, contained two railroad spikes and decomposed wood; crushed coral fill
Id	98-99	Fill; crushed asphalt; 10YR 2/1 (black); massive structure; moist, friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; thin, black layer of asphalt-like material
II	84-290	Natural; clay; 10YR 3/2 (very dark grayish brown); moderate, blocky structure; moist, firm consistency; plastic; Makalapa clay (MdB)

Lab Results: A bulk sediment sample was collected from Stratum II between 2.30-2.60 mbs. The sample did not contain any significant material.

GPR Discussion: A review of amplitude slice maps reflected no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-019 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs and again around 1.00 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-019 was excavated to a depth of 2.9 mbs. The stratigraphy of T-019 consisted of fill (Strata Ia-Id) over natural sediment (Stratum II). The stratigraphy conformed to the USDA soil designation of Makalapa clay (MdB) for this location. Two railroad spikes and decomposed wood (possible railroad tie) were observed in Stratum Ic. These artifacts likely relate to the OR&L and/or Honolulu Plantation railway lines which traversed directly through the vicinity of T-019 from the late 1800s to the late 1940s.

7.2.20 Test Excavation 20 (T-020)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-002:001
Street:	Aolele Street
Owner:	U.S. Postal Service
Elevation:	6.1 m
UTM:	611702.7626 mE, 2359825.529 mN
Max Length/Width/Depth	3.45 m/1.2 m/1.9 m
Orientation:	98°/278° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Makalapa clay (MdB)

Setting: Test Excavation 20 (T-020) was located on a grassy median along Aolele Street between the sidewalk and the chain link fence of the Honolulu International Airport Post Office (see Figure 51; Figure 166). The excavation area was slightly elevated relative to the adjacent road surface.

Summary of Background Research and Land Use: Prior to the establishment of the OR&L railway in the late 1800s, the location of T-020 was largely undeveloped pasture land (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of agriculture in the area, primarily sugar cane. T-020 was located in sugar cane "Field 9" of the former Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the OR&L and Honolulu Plantation railway lines traversed about 130 m north of T-020 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and military infrastructure development in the region which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-020 was excavated to volcanic tuff at a depth of 1.90 mbs. Sediment samples were collected from the bucket of the mechanical excavator due to safety precautions involving the obstruction of the sidewalls by shoring.

Stratigraphic Summary: The stratigraphy consisted of fill strata over natural sediment (Figure 167 and Figure 168). Observed strata were silty clay fill (Stratum Ia), extremely gravelly loam fill (Stratum Ib), and sandy clay fill (Stratum Ic) overlying natural silty clay (Stratum II) and volcanic tuff and ash (Stratum IIIa and IIIb). The stratigraphy generally conformed to the USDA soil survey designation of Makalapa Clay (MdB) for this location.

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Figure 166. Photograph of Airport Section 3, T-020, general location, view to southeast

Figure 167. Photograph of Airport Section 3, T-020, general view of profile, view to north

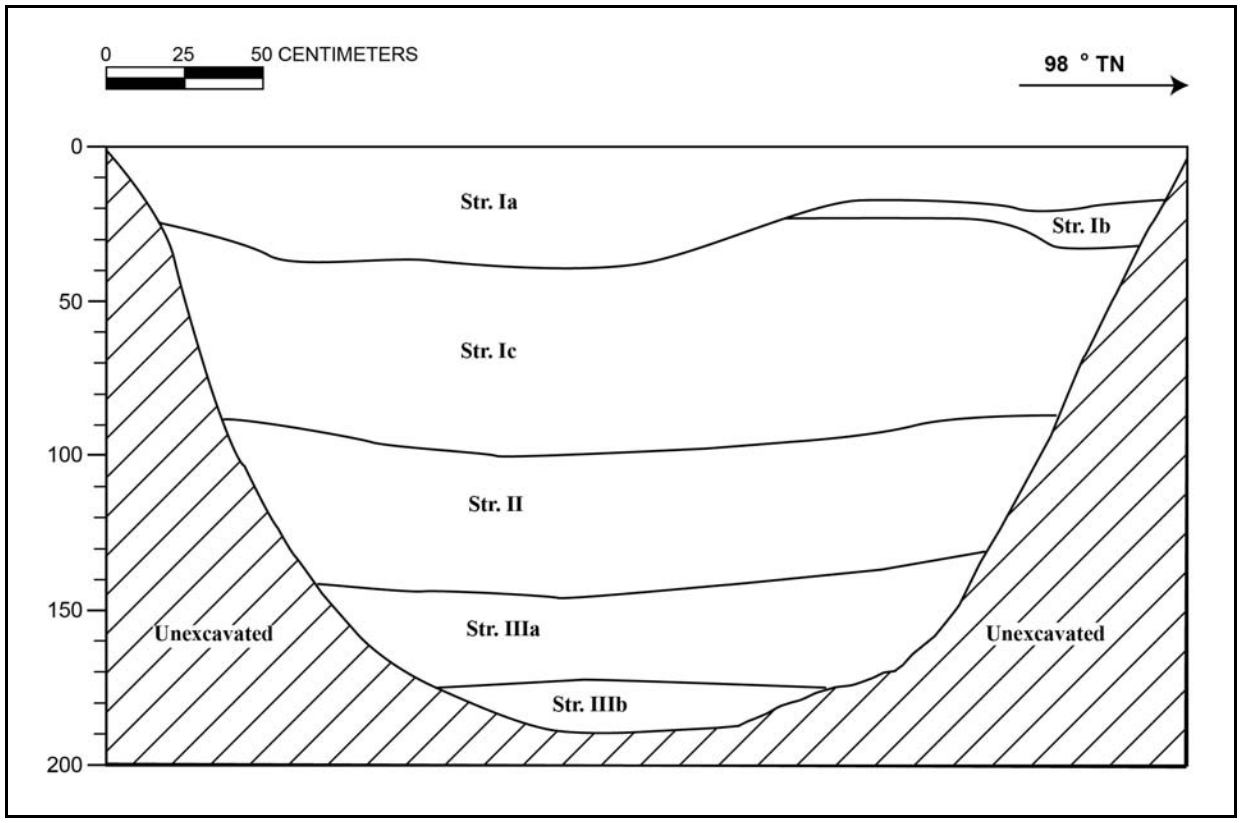


Figure 168. T-020 north profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-39	Fill; silty clay; 2.5YR 3/4 (dark reddish brown); weak, fine, granular structure; moist, very friable consistency; plastic; mixed origin; clear, wavy lower boundary; many medium to coarse roots; contains modern landscaping debris and 5% coral gravels
Ib	15-30	Fill; extremely gravelly loam; 10YR 3/2 (very dark grayish brown); weak, medium, crumb structure; moist, friable consistency; plastic; mixed origin; clear, wavy lower boundary; many fine to coarse roots; contains crushed coral and gravel
Ic	20-100	Fill; sandy clay; 10YR 3/2 (very dark grayish brown); strong, medium to coarse, blocky structure; moist, friable consistency; very plastic; mixed origin; diffuse, smooth lower boundary; many fine to medium roots; contains (5-10%) coral gravels and small cobbles
II	85-145	Natural; silty clay; 2.5YR 4/5 (olive brown); moderate, coarse, blocky structure; moist, firm consistency; plastic; abrupt, smooth lower boundary; few fine roots; contains (1-2%) basalt gravels; Makalapa clay (MdB)
IIIa	130-175	Natural; volcanic tuff; 10YR 4/4 (dark yellowish brown); strong, coarse, platy structure; indurated; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; deposition from the Makalapa eruption(s)
IIIb	175-190	Natural; silty loam/volcanic ash; 10YR 3/2 (very dark grayish brown); strong, very fine, granular structure; dry, extremely hard consistency; slightly plastic; terrigenous origin; lower boundary not visible; alluvium mixed with volcanic lapilli visible (~40 mm diameter)

Lab Results: Bulk sediment samples associated with Strata II, IIIa, and IIIb were collected from the bucket of the mechanical excavator. No significant material was present in any of the sediment samples.

GPR Discussion: A review of amplitude slice maps reflected no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-020 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-020 was excavated to volcanic tuff at a depth of 1.90 mbs. The stratigraphy of T-020 consisted of fill (Strata Ia-Ic) overlying silty clay (Stratum II) and volcanic tuff and ash deposits (Strata IIIa and IIIb). The stratigraphy generally conformed to the USDA soil survey designation of Makalapa Clay (MdB) for this location. No cultural resources were identified within T-020.

7.2.21 Test Excavation 21 (T-021)

***Ahupua‘a*:**	Moanalua
LCA :	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.0 m
UTM:	611782.9396 mE, 2359548.335 mN
Max Length/Width/Depth	3.7 m/1.0 m/2.80 m
Orientation:	187°/7° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 21 (T-021) was located in the landscaped area fronting the Honolulu International Airport *lei* stands under the Rodgers Boulevard viaduct, and about 3.5 m south of Ala Onaona Street (see Figure 52; Figure 169). The excavation area was level with the surrounding land surface, but slightly elevated relative to the adjacent road surface.

Summary of Background Research and Land Use: T-021 was located about 100 m west of Honolulu International Airport Station footprint. This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of agriculture in the area, primarily sugar cane. T-021 was located on the boundary of sugar cane Field 9 of the former Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed about 45 m south of T-021 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105). The development included warehouses constructed in the immediate area of T-021. A railroad spur extended south from the OR&L rail line forming a loop surrounding the area of T-021.

Documentation Limitations: T-021 was excavated to the coral shelf at a maximum depth of 2.80 mbs. An irrigation line was encountered between 0.25 and 0.30 mbs near the north end of T-021, but it did not limit the excavation.

Stratigraphic Summary: The stratigraphy of T-021 consisted of fill strata over natural sediment (Figure 170 and Figure 171). Observed strata were silty clay loam topsoil (Stratum Ia), very gravelly silty sand fill (Stratum Ib), compacted coral pavement (Stratum IIa), and crushed coral base course (Stratum IIb) overlying natural clay (Stratum III) and the coral shelf (Stratum IV). The fill deposits correlate with airport development. The stratigraphy above Stratum III generally conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Figure 169. Photograph of Airport Section 3, T-021, general location, view to south

Figure 170. Photograph of Airport Section 3, T-021, general view of profile, view to southeast

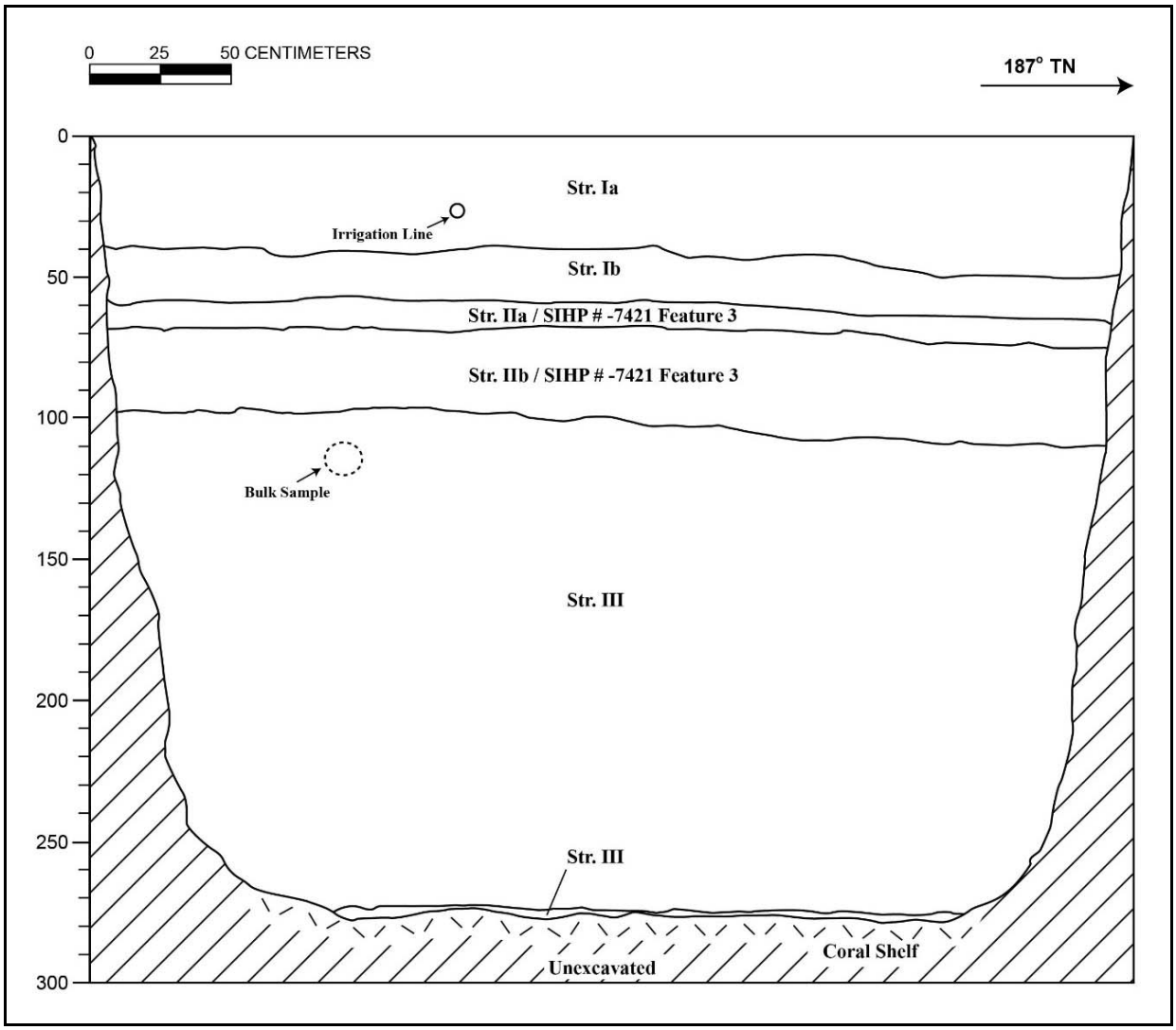


Figure 171. T-021 east profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-50	Fill; silty clay loam; 10YR 3/6 (dark yellow brown); weak, medium, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots; landscaped topsoil
Ib	40-65	Fill; very gravelly silty sand; 10YR 5/2 (grayish brown); structureless, single-grain; moist, loose consistency; mixed origin; abrupt, smooth lower boundary; few fine roots; topsoil subgrade
IIa	60-75	Fill; extremely gravelly silty sand; 10YR 8/2 (very pale brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; compacted coral pavement, considered a component of SIHP # -7421 Feature 3
IIb	70-110	Fill; extremely gravelly silty sand; 10YR 6/4 (light yellow brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; very abrupt, smooth lower boundary; coral base course, considered a component of SIHP # -7421 Feature 3
III	110-225	Natural; clay; 10YR 4/2 (dark gray brown); moderate, coarse, blocky structure; moist, firm consistency; plastic; terrigenous origin, sediment sample contained unidentified bivalvia and miscellaneous marine shell; very abrupt, smooth lower boundary; Makalapa clay (MdB)
IV	225-280	Natural; limestone; 10YR 7/2 (very pale brown); massive structure; very hard consistency; marine origin; coral shelf

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 3, was encountered throughout the entirety of the excavation, between 0.60 and 1.10 mbs. Feature 3 consists of a compacted crushed coral pavement (Stratum IIa) and associated crushed coral base course (Stratum IIb). Feature 3 is interpreted as a buried roadway which would have been been in use circa 1942-43 to facilitate the mass movement of large quantities of heavy material and supplies from the rail line to adjacent warehouses (see Section7.4.3).

Faunal Remains Discussion: No osseous faunal remains were observed during the excavation of T-021. See lab results below for bulk sample contents.

Lab Results: A 1 liter bulk sediment sample was collected from Stratum III, between 1.10 and 1.20 mbs, and yielded < 0.1 g of unidentified bivalvia and miscellaneous marine shell. The results of laboratory analysis indicate non-midden material due to their small size and composition suggestive of natural transportation processes.

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreases with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-021 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.50 mbs. No utilities were observed in the GPR profile but a utility was encountered during excavation. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-021 was excavated to the coral shelf at a maximum depth of 2.80 mbs. The stratigraphy consisted of fill (Strata Ia-Ib) overlying a buried coral roadway (Strata IIa-IIb) designated SIHP # 50-80-13-7421 Feature 3, above natural clay (Stratum III) and the coral shelf (Stratum IV). The stratigraphy generally conformed to the USDA soil designation of Makalapa clay (MdB) for this location. Feature 3 consisted of compacted crushed coral pavement (Stratum IIa) and associated crushed coral base course (Stratum IIb). Feature 3 is associated with an early alignment of a mid-twentieth century roadway (see Section 7.4.3). The rail line shown in the 1943 U.S. Army War Department map and evidence of a coral road (Stratum IIa and IIb) suggest that transport and possible storage of large supply shipments likely occurred at this locale.

7.2.22 Test Excavation 22 (T-022)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.2 m
UTM:	611913.3642 mE, 2359526.966 mN
Max Length/Width/Depth	6.70 m/0.67 m/3.04 m
Orientation:	292°/212° TN
Targeted Project Component:	Honolulu International Airport Station (Entrance Building)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 22 (T-022) was located in the Honolulu International Airport economy parking lot adjacent to the south (*makai*) side of Ala Onaona Street and about 37 m west of the intersection with Ala Auana Street (see Figure 53; Figure 172 and Figure 173). The southern half of the excavation area was on a slight downward slope while the parking lot was raised in relation to the adjacent roadway.

Summary of Background Research and Land Use: T-022 and nearby T-023, T-024, T-025, and T-026 were located within the footprint of the Honolulu International Airport Station. This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-022 was located on the boundary of sugar cane Field 9 of the former Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of the footprint for the Honolulu International Airport Station and about 40 m from T-022 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-022 was excavated to a depth of 3.04 mbs in natural sediment. The base of excavation was determined by the maximum reach of the backhoe.

Stratigraphic Summary: The stratigraphy of T-022 consisted of fill strata over natural sediment (Figure 174 and Figure 175). Observed strata were asphalt (Stratum Ia), basalt gravel base course (Stratum Ib), crushed coral fill (Stratum Ic), and extremely cobbly sandy loam fill with concrete slab pieces (Stratum Id) overlying natural silty clay loam (Stratum II). The stratigraphy above Stratum II conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

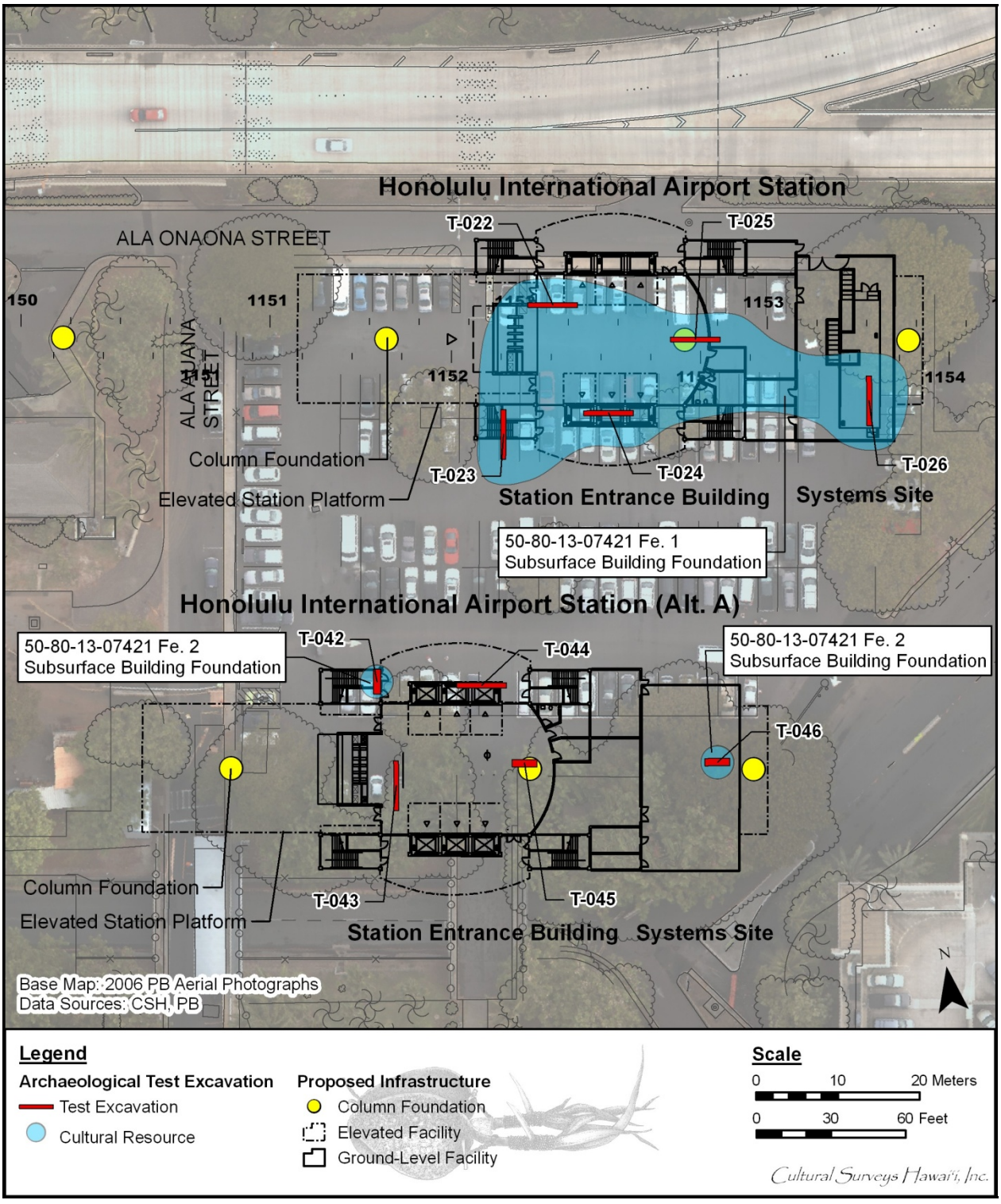


Figure 172. Overview of T-022 through T-026 and T-042 through T-046 in the proposed Honolulu International Airport Station area on the south (*makai*) side of Ala Onaona Street showing cultural resources

Figure 173. Photograph of Airport Section 3, T-022, general location, view to west

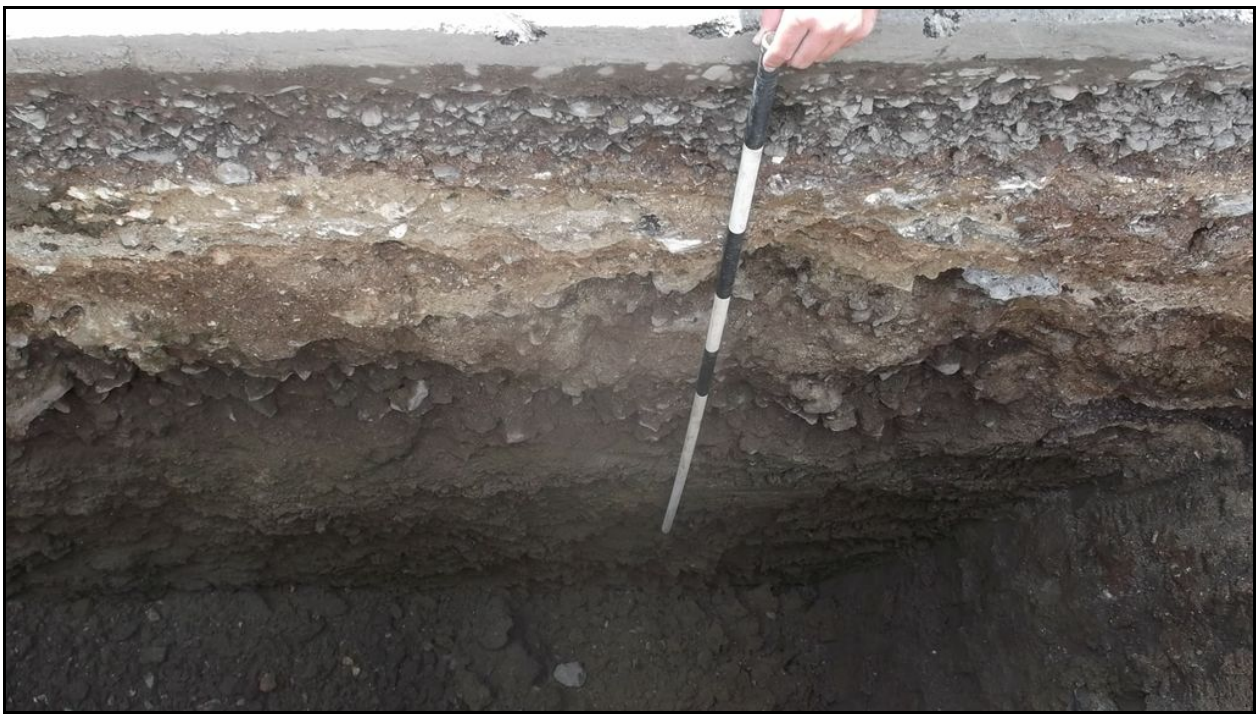


Figure 174. Photograph of Airport Section 3, T-022, general view of profile, view to southwest

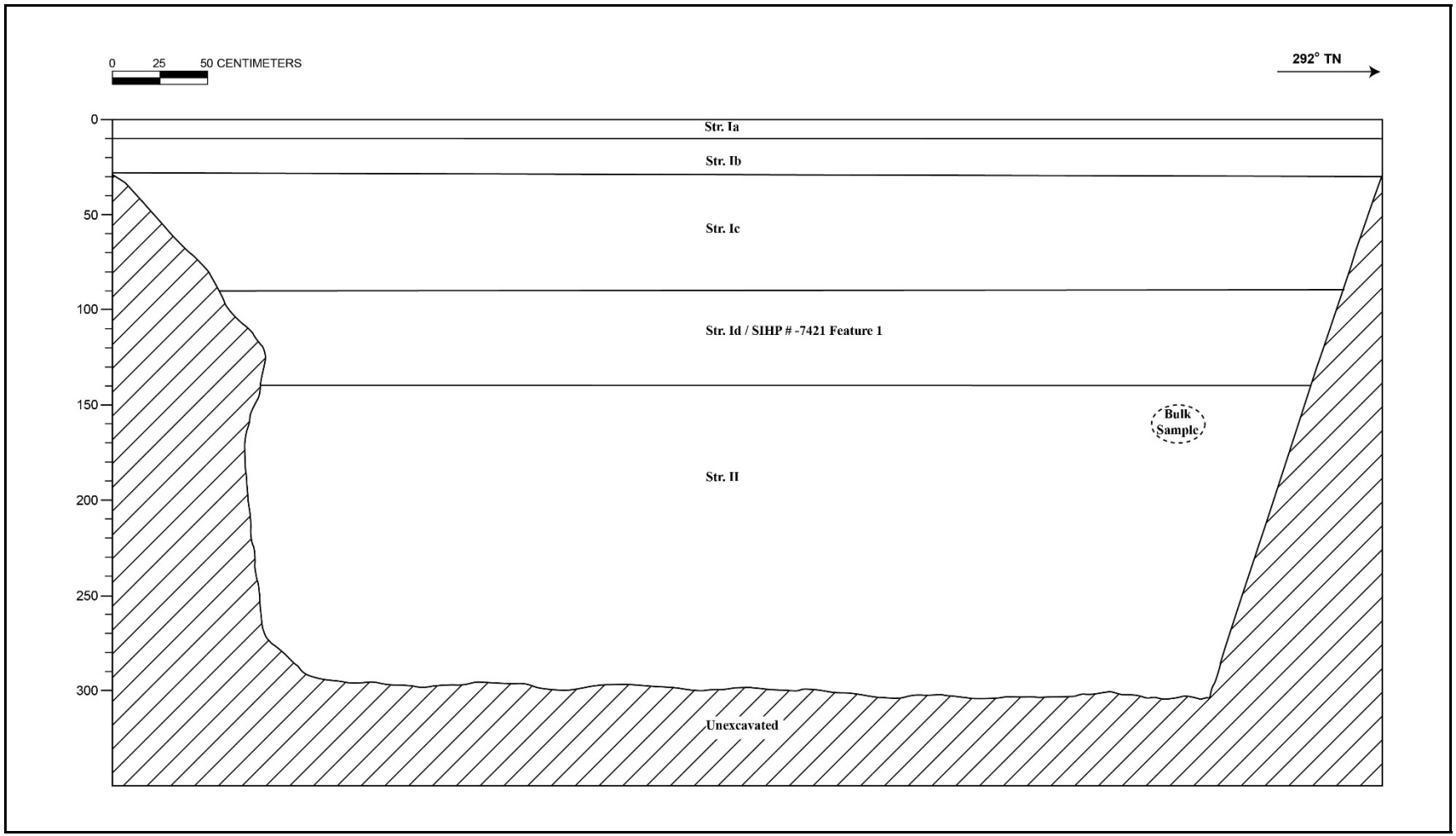


Figure 175. T-022 southwest profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-29	Fill; extremely gravelly sandy loam; 7.5YR 3/1 (very dark gray); weak, medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	29-90	Fill; very gravelly sand; 10YR 6/4 (light yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral fill
Id	90-140	Fill; extremely cobbly sandy loam; 10YR 3/3 (dark brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contains concrete slab pieces at upper boundary, considered a component of SIHP # -7421 Feature 1
II	140-304	Natural; silty clay loam; 7.5YR 3/1 (very dark gray); strong, fine to medium, blocky structure; moist, friable consistency; plastic; mixed origin; natural alluvium

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 1, was encountered within T-022. Feature 1 consists of large concrete slab pieces at about 0.90 mbs in the upper portion of Stratum Id. Feature 1 was interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or warehouse foundation to facilitate the mass movement of supplies from the rail line to warehouses (see Section 7.4.3).

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: A bulk sediment sample of Stratum II collected from the backhoe bucket yielded no significant material. A second sample from Stratum II collected between 1.5 and 2.0 mbs was submitted for pollen analysis (See Section 8). The results of laboratory analysis indicated the presence of many native shrubs and trees along with agricultural cotton and rice remnants.

GPR Discussion: A review of amplitude slice maps reflected no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-022 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-022 was excavated to a depth of 3.04 mbs. The stratigraphy consisted of fill (Strata Ia-Id) over natural silty clay loam (Stratum II). The stratigraphy of T-022 generally conformed to the USDA soil survey designation of Fill land (FL). Concrete slab fragments designated SIHP # 50-80-13-7421 Feature 1 were identified at the upper limit of Stratum Id. These slab fragments possibly are associated with former military warehouses or related structures built in 1942-1943 (see Section 7.4.3).

7.2.23 Test Excavation 23 (T-023)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.3 m
UTM:	611905.0225 mE, 2359512.848 mN
Max Length/Width/Depth:	6.75 m/0.75 m/1.15 m
Orientation:	10^{o}/190^{o} TN
Targeted Project Component:	Honolulu International Airport Station (Entrance Building)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 23 (T-023) was located near the center of the Honolulu International Airport economy parking lot near the eastern (*makai*/Diamond Head) corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 176). The excavation area was on a slight downward slope to the north.

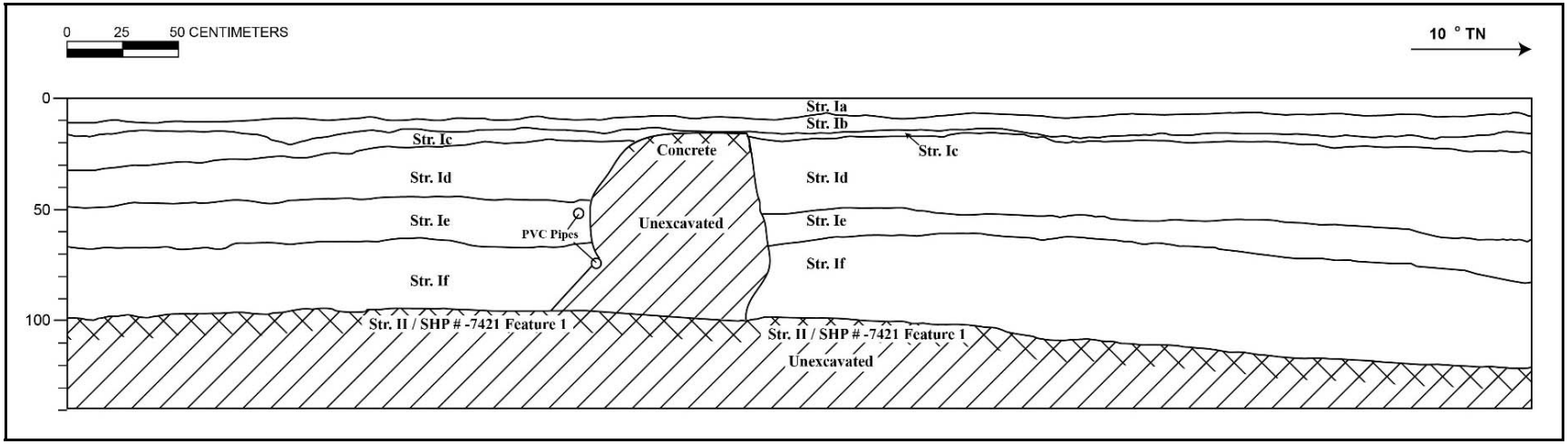
Summary of Background Research and Land Use: T-023 and nearby T-022, T-024, T-025, and T-026 were all located in the footprint of the Honolulu International Airport Station (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-023 was located on the boundary of former sugar cane Field 9 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of the footprint for the Honolulu International Airport Station and about 20 m from T-023 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-023 was excavated to a buried concrete slab at a depth of 1.20 mbs. A concrete jacket and two PVC utility lines limited excavation in the central portion of T-023. Excavation through the concrete slab was not conducted due to potential sidewall instability and to adversely affecting the encased utility lines.

Stratigraphic Summary: The stratigraphy of T-023 consisted of fill strata over a buried concrete slab (Figure 177 and Figure 178). Observed strata were asphalt (Stratum Ia), basalt base course (Stratum Ib), gravelly loam fill (Stratum Ic), very gravelly cobbly silty sand fill (Stratum Id), gravelly sand fill (Stratum Ie), and gravelly silty sand fill (Stratum If) overlying a buried concrete slab (Stratum II). The observed stratigraphy of T-023 conformed to the USDA soil survey designation of Fill land (FL).

Figure 176. Photograph of Airport Section 3, T-023, general location, view to south

Figure 177. Photograph of Airport Section 3, T-023, general view of west profile, view to north



Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	0-22	Fill; extremely gravelly sandy loam; 7.5YR 3/1 (very dark gray); weak, medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base coarse
Ic	18-31	Fill; gravelly loam; 5YR 3/4 (dark reddish brown); weak, coarse, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary
Id	20-53	Fill; very gravelly cobbly silty sand; 10YR 6/4 (light yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
Ie	49-70	Fill; gravelly sand; 7.5YR 7/6 (reddish yellow); weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
If	65-120	Fill; very gravelly silty sand; 2.5YR 7/4 (pale yellow); weak, very fine to fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary
II	98-120	Concrete; considered a component of SIHP # -7421 Feature 1

Figure 178. T-023 west profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 1, consists of a buried concrete slab (Stratum II) encountered at 0.98 mbs and extending beyond the boundaries of the excavation area. Feature 1 was interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or warehouse foundation to facilitate the mass movement of supplies from the rail line to warehouses.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed a linear feature which corresponded to the utility pipe encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth except where the utility was encountered. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs and again at 0.75 mbs.

GPR depth profiles for T-023 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.35 mbs. A utility is clearly depicted in the GPR profile with a large hyperbola corresponding to the location of the utility. The maximum depth of clean signal return was about 1.50 mbs.

Summary: T-023 was excavated to a buried concrete slab at a depth of 1.20 mbs. The stratigraphy of T-023 consisted of fill (Strata Ia to If) over the buried concrete (Stratum II). The stratigraphy observed in T-023 conformed to the USDA soil survey designation of Fill land (FL). The buried concrete slab (Stratum II) is designated as SIHP # 50-80-13-7421 Feature 1 (see Section 7.4.3). It appears to correlate with military-related infrastructure developments in 1942-1943. The 1943 U.S. Army War Department map indicates that large warehouses were previously constructed in the immediate area of the T-023 location as well as to the east and west. A railroad spur extended south from the OR&L rail line, forming a loop in the immediate vicinity of T-023. This rail line likely transported large quantities of heavy material for storage. The buried concrete slab (Stratum II) may have been part of a receiving apron or dock associated with the movement of supplies from the rail line to the warehouses.

7.2.24 Test Excavation 24 (T-024)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.4 m
UTM:	611918.1469 mE 2359512.848 mN
Max Length/Width/Depth:	6.6 m/0.72 m/1.08 m
Orientation:	286°/106° TN
Targeted Project Component:	Honolulu International Airport Station (Entrance Building)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 24 (T-024) was located near the center of the Honolulu International Airport economy parking lot near the eastern (*makai*/Diamond Head) corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 179). The excavation area was relatively level with the surrounding surface.

Summary of Background Research and Land Use: T-024 and nearby T-022, T-023, T-025, and T-026 were all located in the footprint of the Honolulu International Airport Station (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-024 was located on the boundary of former sugar cane Field 9 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of the footprint for the Honolulu International Airport Station and about 25 m from T-024 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (seeFigure 105).

Documentation Limitations: T-024 was excavated to a concrete slab at a depth of 1.08 mbs. Excavation through the concrete slab was not conducted due to potential sidewall instability and affecting encased utility lines.

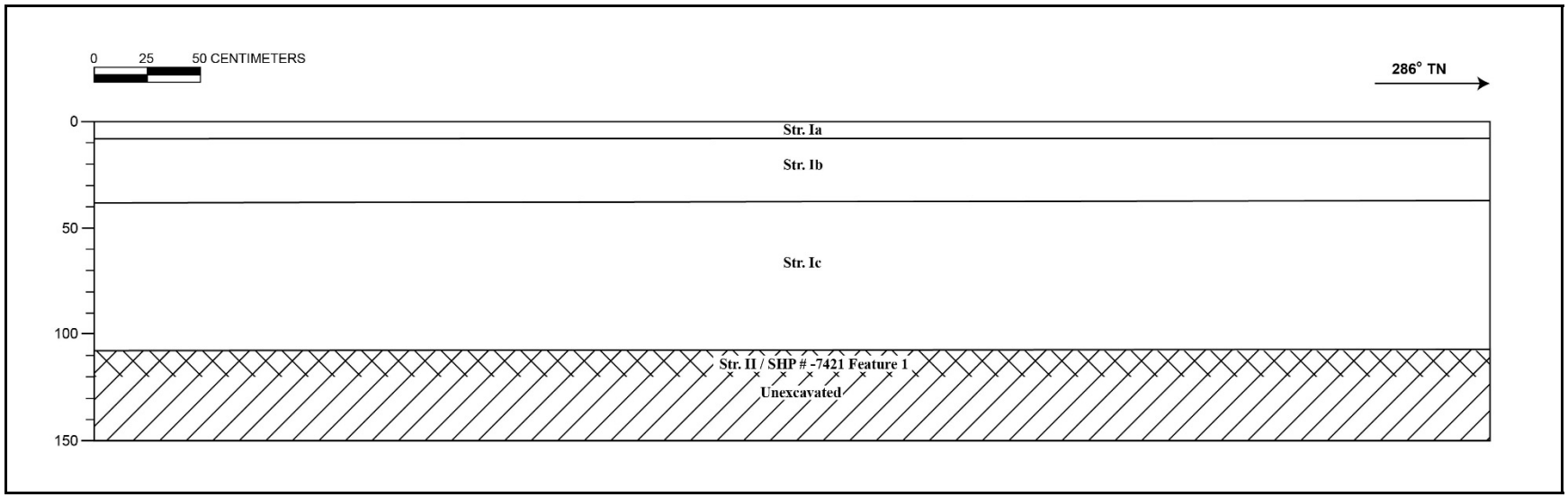
Stratigraphic Summary: The stratigraphy consisted of fill strata overlying a concrete slab (Figure 180 and Figure 181). Observed strata were asphalt (Stratum Ia), basalt base course (Stratum Ib), and gravelly silty sand fill (Stratum Ic) overlying a buried concrete slab (Stratum II). The stratigraphy of T-024 conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 1, consists of a buried concrete slab (Stratum II) encountered at 1.08 mbs and extending beyond the boundaries of the excavation area. The thickness was estimated to be greater than 10 cm. Feature 1 was

Figure 179. Photograph of Airport Section 3, T-024, general location, view to northwest

Figure 180. Photograph of Airport Section 3, T-024, general view of profile, view to west



Stratum	Depth (cmbs)	Description
Ia	0-8	Asphalt
Ib	8-38	Fill; extremely gravelly sandy loam; 7.5YR 3/1 (very dark gray); weak, medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt base course
Ic	38-108	Fill; gravelly silty sand; 10YR 6/4 (light yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral fill
II	108	Concrete; lower boundary not visible; concrete slab, considered a component of SIHP # -7421 Feature 1

Figure 181. T-024 southwest profile and stratigraphic description

interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or warehouse foundation to facilitate the mass movement of supplies from the rail line to warehouses.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-024 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-024 was excavated to a concrete slab at a depth of 1.08 mbs. The stratigraphy consisted of fill (Strata Ia-Ic) overlying a concrete slab (Stratum II). The stratigraphy of T-023 conformed to the USDA soil survey designation of Fill land (FL). The buried concrete slab (Stratum II) is identified as a component of SIHP # 50-80-13-7421 Feature 1 and interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or foundation to facilitate the mass movement of supplies from the former rail line to warehouses (see Section 7.4.3). It is possibly associated with former military warehouses or related structures built circa 1942-1943.

7.2.25 Test Excavation 25 (T-025)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.3 m
UTM:	611930.0379 mE, 2359520.163 mN
Max Length/Width/Depth:	6.75 m/0.74 m/0.90 m
Orientation:	104°/284° TN
Targeted Project Component:	Honolulu International Airport Station (Entrance Building)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 25 (T-025) was located near the edge of the Honolulu International Airport economy parking lot on the southeast (*makai*/Diamond Head) corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 182). The excavation area was relatively flat in relation to the surrounding surface.

Summary of Background Research and Land Use: T-025 and nearby T-022, T-023, T-024, and T-026 were all located in the footprint of the Honolulu International Airport Station (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-025 was located on the boundary of former sugar cane Field 9 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of the footprint for the Honolulu International Airport Station and about 35 m from T-025 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-025 was excavated to a concrete slab at a depth of 0.90 mbs. Excavation through the concrete slab was not conducted due to potential sidewall instability and affecting encased utility lines.

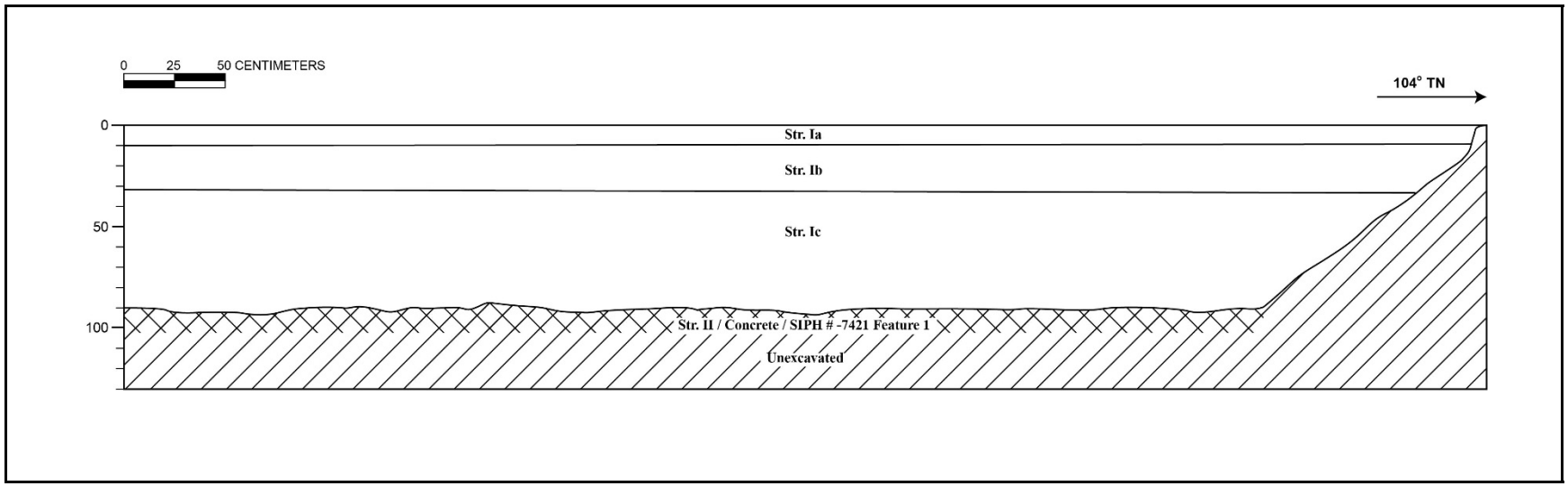
Stratigraphic Summary: The stratigraphy consisted of fill strata to a concrete slab (Figure 183 and Figure 184). The observed strata were asphalt (Stratum Ia), basalt base course (Stratum Ib), and crushed coral fill (Stratum Ic) overlying a buried concrete slab (Stratum II). The stratigraphy of T-025 conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 1, consists of a buried concrete slab (Stratum II) encountered at 0.90 mbs and extending beyond the boundaries of the excavation area. The thickness was estimated to be greater than 10 cm. Feature 1 was

Figure 182. Photograph of Airport Section 3, T-025, general location, view to west

Figure 183. Photograph of Airport Section 3, T-025, general view of profile, view to northeast



Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-31	Fill; very gravelly sandy loam; 5YR 3/3 (dark reddish brown); weak, fine crumb structure; moist, loose consistency; no cementation; non-plastic, mixed origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	31-90	Fill; gravelly sand; 10YR 7/3 (very pale brown) single-grain, structureless; moist, loose consistency; non-plastic; marine origin; crushed coral base course
II	90	Concrete; terrigenous origin; lower boundary not visible; concrete slab, considered a component of SIHP # -7421 Feature 1

Figure 184. T-025 northeast profile and stratigraphic description

interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or warehouse foundation to facilitate the mass movement of supplies from the rail line to warehouses.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No samples were collected for laboratory analysis.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-025 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.75 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-025 was excavated to a concrete slab at a depth of 0.90 mbs. The stratigraphy consisted of fill (Strata Ia-Ic) overlying a concrete slab (Stratum II). The stratigraphy of T-025 conformed to the USDA soil survey designation of Fill land (FL). The buried concrete slab (Stratum II) is identified as a component of SIHP # 50-80-13-7421 Feature 1 and interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or foundation to facilitate the mass movement of supplies from the former rail line to warehouses (see Section 7.4.3). It is possibly associated with former military warehouses or related structures built circa 1942-1943.

7.2.26 Test Excavation 26 (T-026)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.2 m
UTM:	611949.9499 mE, 2359509.558 mN
Max Length/Width/Depth:	6.7 m/0.73 m/0.82 m
Orientation:	6^{o}/186^{o} TN
Targeted Project Component:	Honolulu International Airport Station (Entrance Building)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 26 (T-026) was located near the edge of the Honolulu International Airport economy parking lot on the southeast (*makai*/Diamond Head) corner of Ala Onaona Street and Ala Auana Street, about 47 m west of the airport parking lot exit (see Figure 53 and Figure 172; Figure 185). The excavation area was level within the surrounding surface.

Summary of Background Research and Land Use: T-026 and nearby T-022, T-023, T-024, and T-025 were all located in the footprint of the Honolulu International Airport Station (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-026 was located on the boundary of former sugar cane Field 9 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of the footprint for the Honolulu International Airport Station and about 25 m from T-026 (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

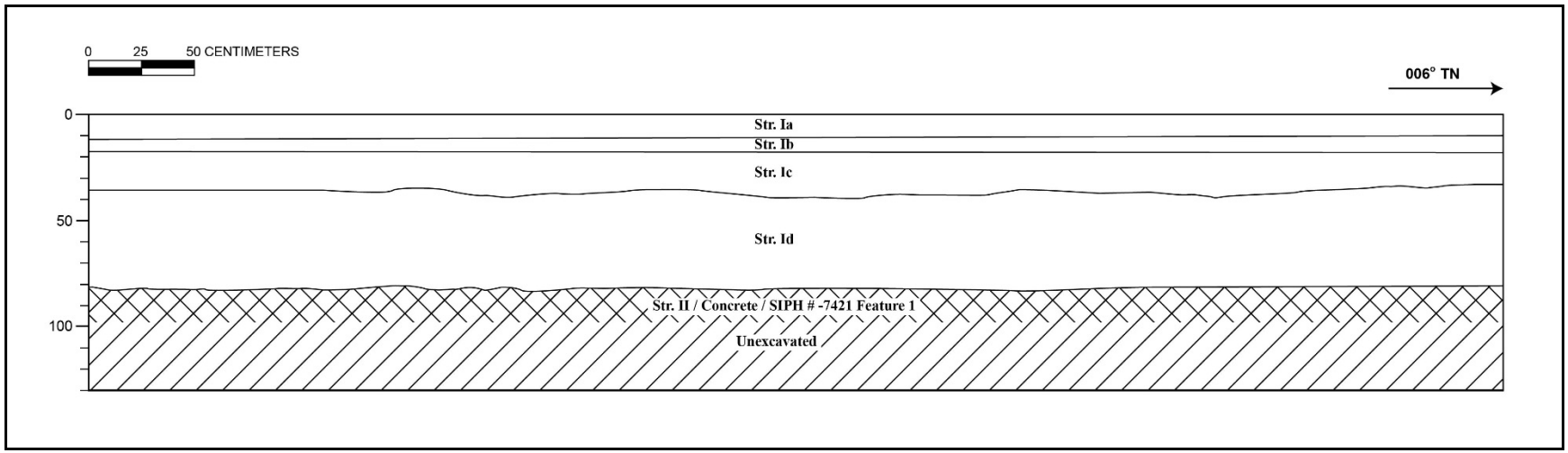
Documentation Limitations: T-026 was excavated to a concrete slab at a depth of 0.82 mbs. Excavation through the concrete slab was not conducted due to potential sidewall instability and to possibly affecting encased utility lines.

Stratigraphic Summary: The stratigraphy consisted of fill overlying a concrete slab (Figure 186 and Figure 187). Observed strata were asphalt (Stratum Ia), basalt base course (Stratum Ib), extremely gravelly sandy loam fill (Stratum Ic), and crushed coral fill (Stratum Id) overlying a buried concrete slab (Stratum II). The stratigraphy of T-026 conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Figure 185. Photograph of Airport Section 3, T-026, general location, view to south

Figure 186. Photograph of Airport Section 3, T-026, general view of profile, view to west



Stratum	Depth (cmbs)	Description
Ia	0-12	Asphalt
Ib	12-17	Fill; extremely gravelly sandy loam; 7.5YR 3/1 (very dark gray); weak, medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt base course
Ic	17-36	Fill; extremely gravelly sandy loam; 5YR 4/4 (reddish brown); structureless, single-grain; moist, friable consistency; non-plastic; terrigenous origin; very abrupt; highly compacted base coarse
Id	36-82	Fill; gravelly sand 10YR 7/3 (very pale brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; crushed coral
II	82	Concrete; considered a component of SIHP # -7421 Feature 1

Figure 187. T-026 west profile and stratigraphic description

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 1, consists of a buried concrete slab (Stratum II) encountered at 0.82 mbs and extending beyond the boundaries of the excavation area. Feature 1 was interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or warehouse foundation to facilitate the mass movement of supplies from the rail line to warehouses.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-026 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs and again around 0.75 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-026 was excavated to a concrete slab at a depth of 0.82 mbs. The stratigraphy of T-026 consisted of fill (Strata Ia-Id) overlying a concrete slab (Stratum II). The stratigraphy of T-026 conformed to the USDA soil survey designation of Fill land (FL). The buried concrete slab (Stratum II) is identified as a component of SIHP # 50-80-13-7421 Feature 1 and interpreted as a prepared, hard surface, possibly functioning as a receiving apron, dock, or foundation to facilitate the mass movement of supplies from the former rail line to warehouses (see Section 7.4.3). It is possibly associated with former military warehouses or related structures built circa 1942-1943.

7.2.27 Test Excavation 27 (T-027)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.0 m
UTM:	612224.0934 mE, 2359475.254 mN
Max Length/ Width/Depth:	3.7 m/0.95 m/2.82 m
Orientation:	278°/98° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 27 (T-027) was located in the landscaped area along the southern (*makai*) side of Ala Onaona Street (see Figure 54; Figure 188). T-027 was about 270 m east of the footprint for the Honolulu International Airport Station Facility. The excavation area was slightly elevated with a tree located to the west.

Summary of Background Research and Land Use: The location of T-027 was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s. By the 1900s, the railway facilitated plantation development of the area. T-027 was located within a former sugar cane field No. 8 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly south of T-027 (see Figure 102). The 1943 U.S. Army War Department map shows military-related residential and military infrastructure development in the immediate area which continued past the mid-1940s (see Figure 105). The substantial residential subdivision known as “Damon Tract” was established here in the early 1950s (see Figure 107).

Documentation Limitations: T-027 was excavated to the coral shelf at a maximum depth of 2.82 mbs. A shallow irrigation line was encountered along the northern (*mauka*) wall of the excavation, but it did not affect the excavation. No specific factors limited the documentation of T-027.

Stratigraphic Summary: The stratigraphy consisted fill strata over natural sediment (Figure 189 and Figure 190). Observed strata were very gravelly clay loam topsoil (Stratum Ia), gravelly sandy clay loam (Stratum Ib), a buried asphalt layer (Stratum IIa), basalt gravel base course (Stratum IIb), crushed coral fill (Stratum IIc), and very gravelly sand fill (Strata IId to IIf), overlying natural alluvial sediment of silty clay loam (Stratum III) to the coral shelf. The buried asphalt pavement (Stratum IIa) does not correspond to the location of any paved roads on the historic maps examined and likely represents infrastructure less than 50 years of age. The

Figure 188. Photograph of Airport Section 3, T-027, general location, view to west

Figure 189. Photograph of Airport Section 3, T-027, general view of profile, view to southeast

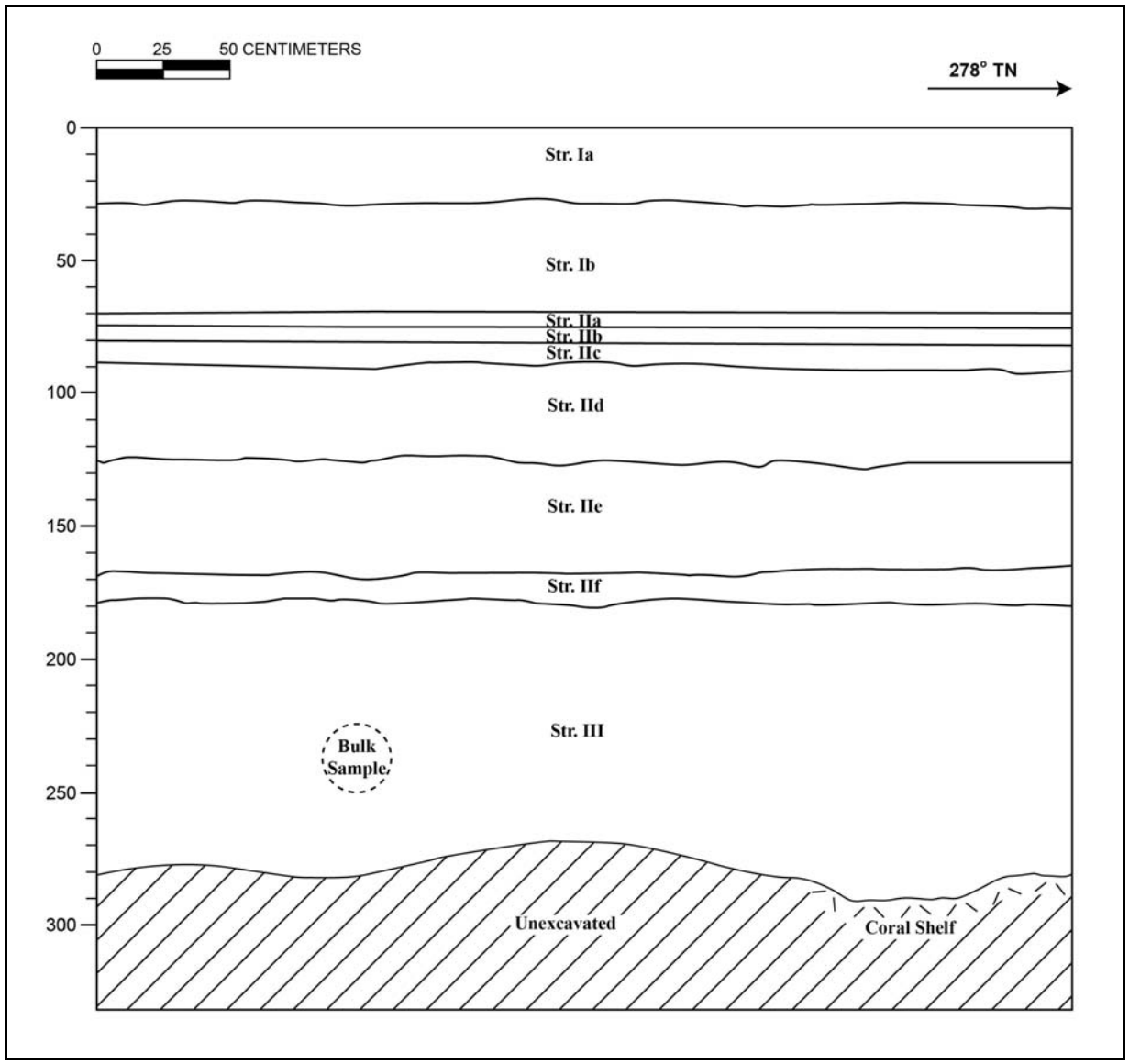


Figure 190. T-027 south profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-25	Fill; very gravelly clay loam; 7.5YR 3/2 (dark brown); weak, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; fine to medium roots common; topsoil
Ib	25-70	Fill; gravelly sandy clay loam; 10YR 4/4 (dark yellowish brown); weak, fine, crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; few fine roots; basalt gravel landscaping fill
IIa	70-75	Asphalt; abrupt, smooth lower boundary
IIb	75-80	Fill; very gravelly cobbly loam; 7.5YR 3/1 (very dark gray); moderate, medium, blocky structure; moist, loose consistency; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
IIc	80-88	Fill; very gravelly sand;10YR7/3 (very pale brown) structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
IId	88-125	Fill; very gravelly medium-grain sand; 2.5YR 7/3 (pale yellow); structureless, single-grain; moist, loose; non-plastic; marine origin; abrupt, smooth lower boundary
IIe	125-170	Fill; very gravelly medium-grain sand; 2.5YR 8/3 (pale yellow); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; contained marine shell and coral inclusions
IIf	170-179	Fill; very gravelly medium-grain sand; 10YR 7/3 (very pale brown); structureless, single-grain; moist, friable consistency; non-plastic; marine origin; abrupt, smooth lower boundary; contains coral
III	179-282	Natural; silty clay loam; 10YR 4/3 (brown); moderate, fine crumb structure; moist, firm consistency; slightly plastic; terrigenous origin; upper boundary slightly disturbed; bulk sediment sample contained naturally-deposited marine shell; alluvial sediment overlying coral shelf

stratigraphy generally conformed to the USDA soil survey designation of Fill Land (FL) above Stratum III at 1.79 mbs.

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains were observed during the excavation of T-027. See lab results below for invertebrate shell in bulk sample contents.

Lab Results: A 1 liter bulk sediment sample collected from Stratum III between 2.29-2.49 mbs yielded a trace (< 0.1 g) of *Turbo sandwicensis*, *Hipponix sp*., unidentified bivalvia and miscellaneous marine shell. This trace of marine shell within the Stratum III alluvial deposit likely reflects natural processes.

GPR Discussion: A review of amplitude slice maps did not clearly indicate any linear features although an irrigation line was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-027 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.20 mbs and again around 0.60 mbs. No utilities were observed in the GPR profile although an irrigation line was encountered during excavation. The maximum depth of clean signal return was about 0.75 mbs.

Summary: The stratigraphy within T-027 consisted of landscaping fill (Strata Ia and Ib), buried asphalt pavement (Stratum IIa), associated base course fill (Strata IIb and IIc), and other fill deposits (Strata IId to IIf) overlying natural sediment (Stratum III) above the coral shelf. The stratigraphy above Stratum III conformed to the USDA soil survey designation of Fill land (FL).

T-027 was located east of the main area of 1942-1943 military activity that dominated the stratigraphic record in the excavations to the west. Instead, this area was primarily characterized by unpaved roads until the late 1940s to the early 1950s development of the residential “Damon Tract.” The buried asphalt pavement (Stratum IIa) does not correspond to the location of any paved roads on the historic maps examined, suggesting it represents infrastructure less than 50 years of age.

7.2.28 Test Excavation 28 (T-028)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Aolele Street
Owner:	State DOT Airports Division
Elevation:	5.6 m
UTM:	612756.7395 mE, 2359413.536 mN
Max Length/Width/Depth:	3.55 m/0.92 m/2.05 m
Orientation:	92°/272° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 28 (T-028) was located in the median along Aolele Street south (*makai*) of the H-1 on-ramp and about 27 m west of the intersection with Aopoko Place (see Figure 55; Figure 191). The excavation area was slightly elevated in relation to the adjacent road surface.

Summary of Background Research and Land Use: The location of T-028 was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s. By the 1900s, the railway facilitated plantation development of the area. According to the 1933 U.S. Army War Department Fire Control map (Honolulu quadrangle), T-028 is about 60 m north of a Honolulu Plantation pipe line and less than 400 m south of the OR&L rail line (see Figure 102). T-028 was located within former sugar cane "Field 7" of the Honolulu Plantation circa 1935 (see Figure 104). The 1943 U.S. Army War Department map shows military-related residential and infrastructure development in the immediate area which continued past the mid-1940s (see Figure 106). The substantial residential subdivision known as "Damon Tract" was established here in the early 1950s (see Figure 107).

Documentation Limitations: T-028 was excavated to a maximum depth of 2.05 mbs. Although an abandoned utility line was encountered in the west end of the excavation at 0.90 mbs it did not limit the excavation.

Stratigraphic Summary: The stratigraphy consisted of several fill strata overlying natural sediment (Figure 192 and Figure 193). Observed strata were gravelly loam fill (Stratum Ia), very gravelly cobbly loam fill (Stratum Ib), very gravelly sandy loam fill (Stratum Ic), gravelly loam fill (Stratum Id), gravelly cobbly loam fill (Stratum Ie), and very gravelly sandy loam fill (Stratum If) overlying natural volcanic tuff (Stratum II). The stratigraphy above Stratum II conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 191. Photograph of Airport Section 3, T-028, general location, view to southwest

Figure 192. Photograph of Airport Section 3, T-028, general view of profile, view to northwest

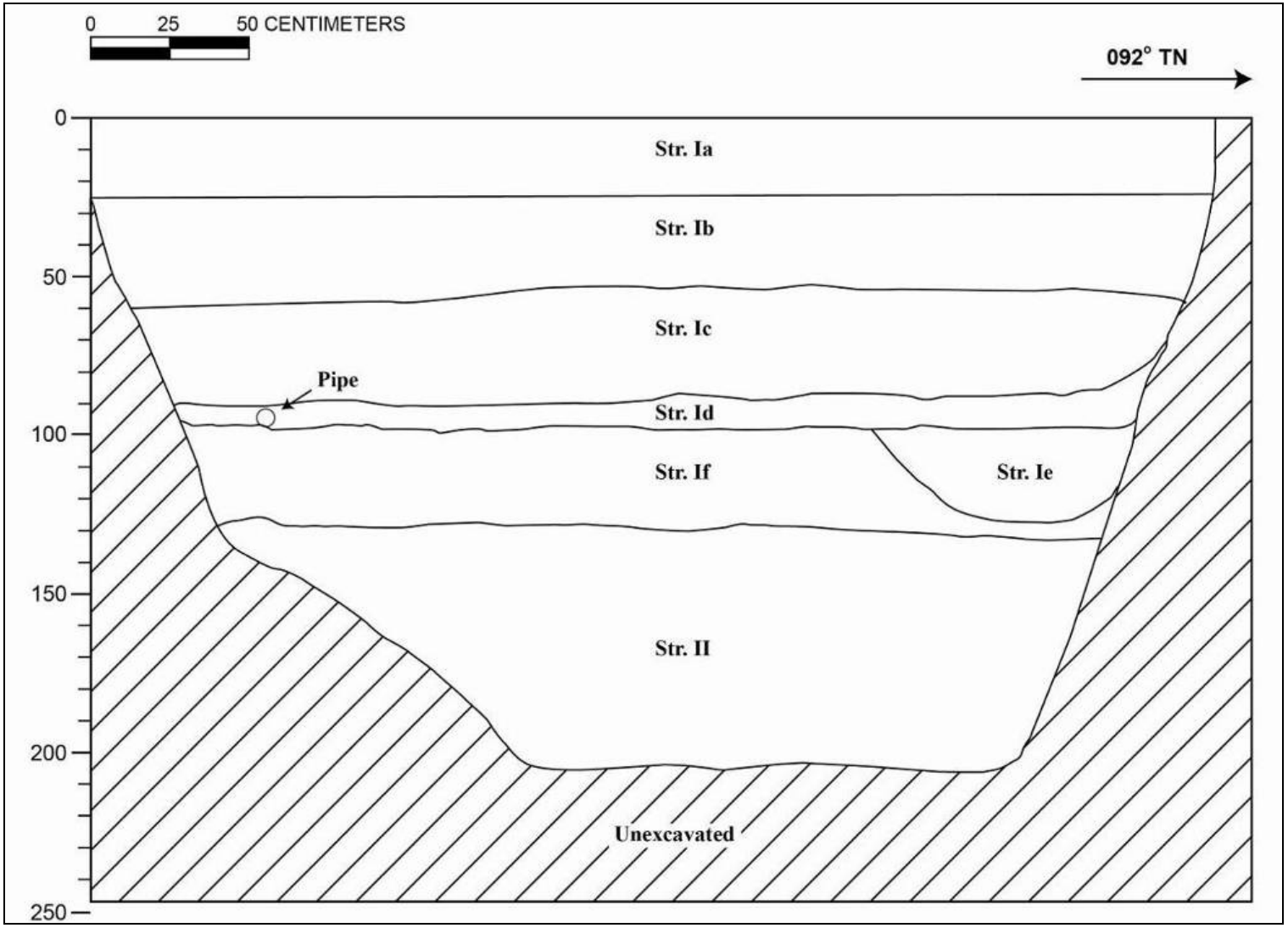


Figure 193. T-028 north profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-25	Fill; gravelly loam; 5YR 3/3 (dark reddish brown); weak, fine blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; fine roots common
Ib	25-58	Fill; very gravelly cobbly loam; 10YR 6/4 (light yellowish brown); weak, fine crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; fine roots common; contains concrete and asphalt
Ic	58-90	Fill; very gravelly sandy loam; 10YR 7/3 (very dark brown); weak, fine crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; few fine roots
Id	90-99	Fill; gravelly loam; 10YR 4/4 (brown); weak, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; few very fine roots; contains coral and a metal utility pipe
Ie	99-128	Fill; gravelly cobbly loam; 10YR 6/6 (brownish yellow); weak, fine crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt, broken/discontinuous lower boundary; contains coral
If	99-130	Fill; very gravelly sandy loam; 10YR 8/2 (very pale brown); structureless, single-grain; moist, very friable consistency; non-plastic; marine origin; abrupt, smooth lower boundary
II	130-205	Natural; volcanic tuff; 10YR 3/2 (dark grayish brown) mottled with (clay bands) of 10YR 7/2 (light gray); moderate, medium, platy structure; moist, friable to firm consistency; non-plastic; terrigenous origin; consists of multiple bands of varying composition including indurated platy rock

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth except for the storm drain adjacent to the trench. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs and increased again around 0.75 mbs.

GPR depth profiles for T-028 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile although one was encountered during excavation and a storm drain is present on the east side of the grid. The maximum depth of clean signal return was about 1.50 mbs.

Summary: T-028 was excavated to a maximum depth of 2.05 mbs in volcanic tuff. The stratigraphy consisted of several fill strata (Strata Ia-If) overlying natural sediment (Stratum II). The stratigraphy above the volcanic tuff conformed to the USDA soil survey designation of Fill land (FL). No cultural resources were identified within T-028.

7.2.29 Test Excavation 29 (T-029)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:017
Street:	Aolele Street
Owner:	State DOT Airports Division
Elevation:	4.7 m
UTM:	612600.7411 mE, 2359417.322 mN
Max Length/Width/Depth:	6.70 m/0.62 m/1.38 m
Orientation:	98°/278° TN
Targeted Project Component:	Utility Corridor
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 29 (T-029) was located in the Enterprise Car Return lot on the southwest (*makai*/‘Ewa) corner Aolele Street, about 34 m west of the intersection with Aolewa Place (see Figure 55; Figure 194). The excavation area was slightly elevated in relation to the surrounding land surface.

Summary of Background Research and Land Use: The location of T-029 was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s. By the 1900s, the railway facilitated plantation development of the area. T-029 was located near the boundary of former sugar cane Field 7 and Field 8 of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed within 50 m east of T-029 (see Figure 102). The 1943 U.S. Army War Department map shows military-related residential and military infrastructure development in the immediate area which continued past the mid-1940s (see Figure 106). The substantial residential subdivision known as “Damon Tract” was established here in the early 1950s (see Figure 107).

Documentation Limitations: T-029 was excavated to the coral shelf at a maximum depth of 1.38 mbs. An abandoned pipe was observed at the north end of the upper portion of the southwest wall but it did not limit excavation.

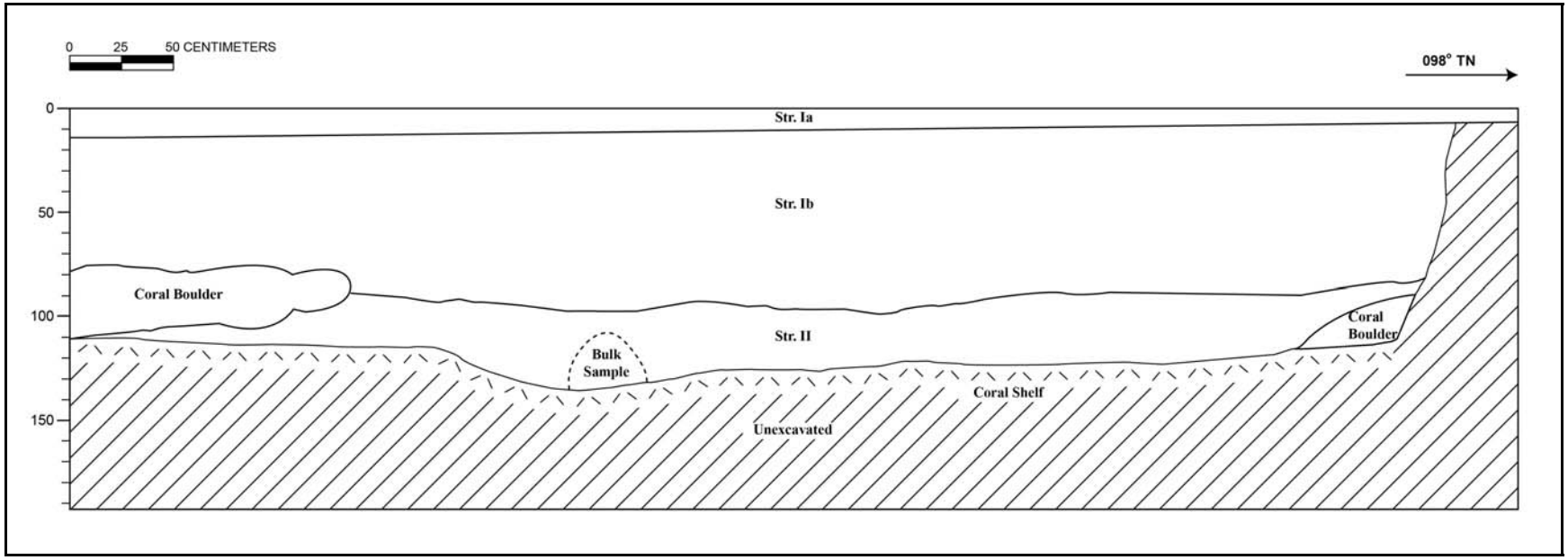
Stratigraphic Summary: The stratigraphy of T-029 consisted of fill strata over natural sediment (Figure 195 and Figure 196). Observed strata were asphalt (Stratum Ia) and associated base course fill (Stratum Ib) overlying natural silty clay loam (Stratum II) above the coral shelf. Stratum II was previously disturbed or reworked natural sediment. The stratigraphy above Stratum II conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed during the excavation of T-029. See lab results below for bulk sample contents.

Feature Discussion: No features were observed.

Figure 194. Photograph of Airport Section 3, T-029, general location, view to northwest

Figure 195. Photograph of Airport Section 3, T-029, general view of profile, view to west



Stratum	Depth (cmbs)	Description
Ia	0-12	Asphalt
Ib	12-98	Fill; very gravelly loam; 10YR 4/2 (dark grayish brown); weak, fine, blocky structure; moist, very friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; few fine roots; contains abandoned pipe, and foil on southwest wall; gravel base course
II	88-138	Natural; silty clay loam; 10YR 4/4 (dark yellowish brown); weak, fine, crumb structure; moist, firm consistency; slightly plastic; terrigenous origin; lower boundary not visible; few fine roots; asphalt pieces observed at interface with Ib; contains angular coral cobbles and two small glass fragments (collected in bulk sample), likely disturbed/reworked natural sediment, possibly related to agricultural activity

Figure 196. T-029 north profile and stratigraphic description

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: A 2 liter bulk sediment sample collected from Stratum II between 1.07 and 1.35 mbs yielded two small glass fragments (< 0.1 g), tiny snail fragments (< 0.1 g), and small root filaments (< 0.1 g). Foil was observed in Stratum Ib but not collected. The results of laboratory analysis indicate the minimal presence of intrusive historic materials.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might indicate the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreases with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-029 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.20 mbs and again around 80 cmbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.30 mbs.

Summary: T-029 was excavated to the coral shelf at a depth of 1.38 mbs. The stratigraphy of T-029 consisted of fill (Strata Ia-Ib) over natural silty clay loam (Stratum II) above the coral shelf. The stratigraphy above Stratum II conformed to the USDA soil survey designation of Fill land (FL). The results of laboratory analysis indicate the minimal presence of intrusive historic materials. No cultural resources were identified within T-029.

7.2.30 Test Excavation 30 (T-030)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Aolele Street
Owner:	State DOT Airports Division
Elevation:	2.9 m
UTM:	613299.9040 mE, 2359373.549 mN
Max Length/Width/Depth:	3.60 m/1.08 m/3.05 m
Orientation:	286°/106° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 30 (T-030) was located about 11 m north (*mauka*) of Aolele Street in a grassy embankment near a drainage canal (see Figure 57; Figure 197). The northern half of the excavation area was on a slight downward slope.

Summary of Background Research and Land Use: The location of T-030 was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s. According to the 1933 U.S. Army War Department Fire Control map (Honolulu quadrangle), T-030 is about 60 m southeast of a road leading south to Rodgers Airport (present-day Honolulu International Airport) and about 80 m north of Kaloaloa Pond (see Figure 102). T-030 was located within former sugar cane "Field 7 ½"of the Honolulu Plantation circa 1935 (see Figure 104). The 1943 U.S. Army War Department (Honolulu quadrangle) map shows the immediate vicinity of T-030 as on the edge of undeveloped land around the airport (see Figure 106). According to the 1953 U.S. Army Mapping Service (Puuloa quandrangle) map, the location of T-030 is within the substantial residential subdivision known as "Damon Tract" (see Figure 107).

Documentation Limitations: T-030 was excavated to a depth of 2.90 mbs. The base of excavation was determined by the maximum reach of the backhoe. There were no specific factors that limited documentation.

Stratigraphic Summary: The stratigraphy consisted of fill strata to the base of excavation (Figure 198 and Figure 199). Observed strata included very gravelly silty loam fill (Stratum Ia), very gravelly cobbly sandy loam (Stratum Ib), gravelly sandy loam fill (Stratum Ic), very cobbly loam fill (Stratum Id), and gravelly loam fill (Stratum Ie) to the base of excavation. Stratum Id contained angular basalt cobbles and cobble-sized asphalt inclusions. Also present was a utility pit intrusive into the two upper-most fill deposits (Stratum Ia and Ib) for a PVC pipe toward the western end of T-030. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 197. Photograph of Airport Section 3, T-030, general location, view to west

Figure 198. Photograph of Airport Section 3, T-030, general view of profile, view to southwest

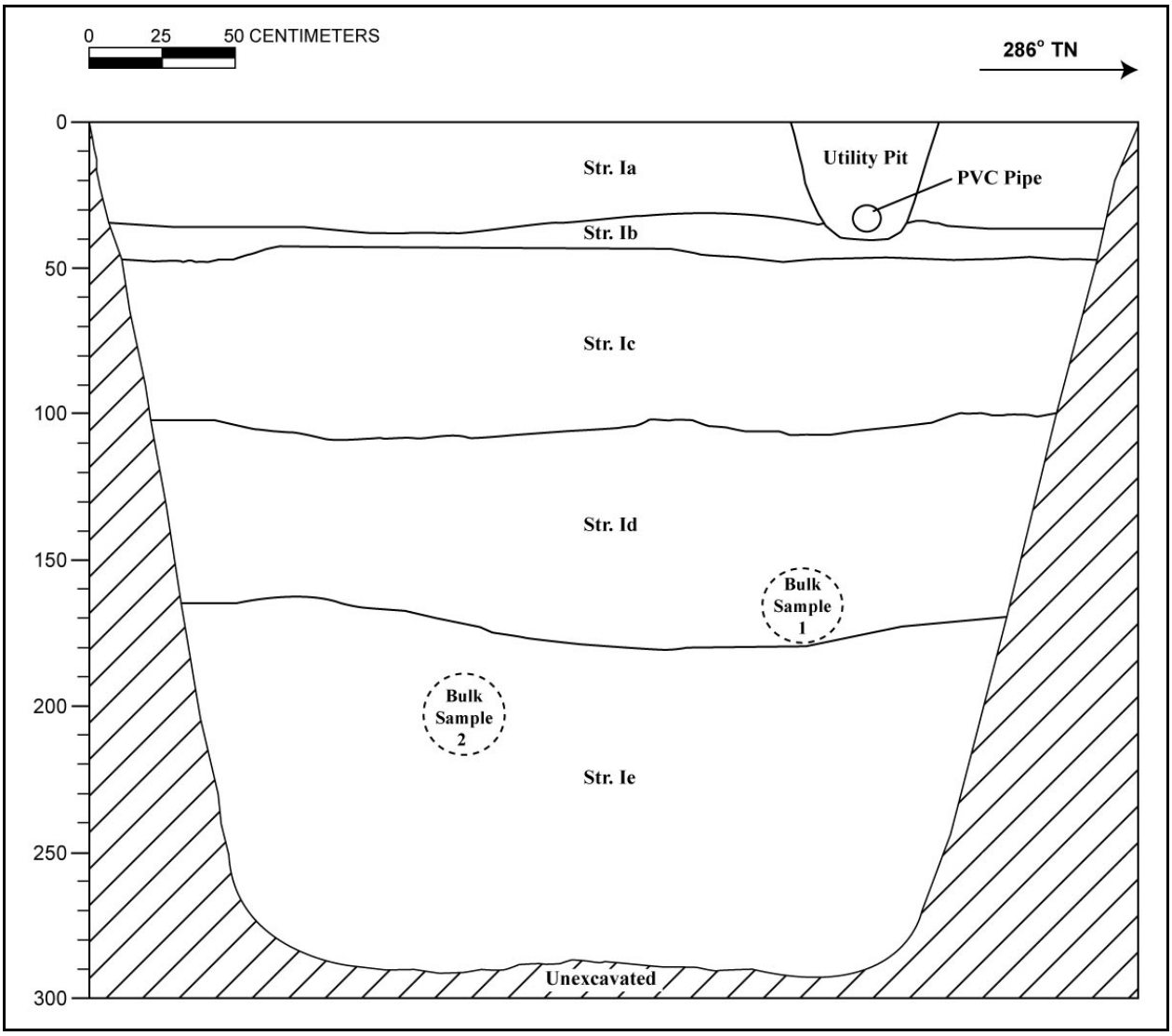


Figure 199. T-030 south profile (above) and stratigraphic description (below)

Stratum	Depth(cmbs)	Description
Utility Pit	0-40	Fill; utility pit for PVC irrigation pipe; intrusive into Ia and Ib; contained butchered pig rib
Ia	0-36	Fill; very gravelly silty loam; 10YR 3/6 (dark yellowish brown); weak, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; many fine roots
Ib	36-43	Fill; very gravelly cobbly sandy loam; 10YR 7/3 (very pale brown): weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; few fine roots; contained a butchered sheep femur
Ic	43-102	Fill; gravelly sandy loam; 10YR 6/3 (pale brown); weak, medium, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; few fine roots
Id	102-180	Fill; very cobbly loam; 10YR 4/4 (dark yellowish brown); moderate, medium, crumb structure; moist, firm consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; few very fine roots; contained angular basalt/asphalt cobbles
Ie	161-290	Fill; gravelly loam; 10YR 3/3 (dark brown) mottled with (15%) of 10YR 8/4 (very pale brown); weak, fine, blocky structure; moist, friable consistency; slightly plastic; mixed origin; contained 15% coral gravel

Faunal Remains Discussion: A butchered pig (*Sus scrofa*) rib portion was encountered within the utility pit for the PVC pipe. A butchered sheep (*Ovis aries*) femoral portion was collected from Stratum Ib at 0.40 mbs. The faunal remains are identified as historic or modern food refuse.

Lab Results: Bulk sediment samples were collected from Stratum Id between 1.56 and 1.75 mbs and from Stratum Ie between 1.87 and 2.17 mbs. The sediment samples yielded no significant material.

GPR Discussion: A review of amplitude slice maps revealed a linear feature around 0.25-0.50 mbs which corresponded to a utility that was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth except for the area that contained the utility. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-030 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. An anomaly was observed in the GPR profile and corresponded to the utility encountered during excavation. The maximum depth of clean signal return was about 1.25 mbs).

Summary: T-030 was excavated to a maximum depth of 3.05 mbs. The stratigraphy consisted of fill strata (Strata Ia-Ie) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Faunal remains collected from the utility pit and Stratum Ib fill consisted of a butchered pig (*Sus scrofa*) rib and butchered sheep (*Ovis aries*) femur which represent historic or modern food refuse.

7.2.31 Test Excavation 31 (T-031)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-004:012
Street:	Ualena Street
Owner:	State DOT Airports Division
Elevation:	2.9 m
UTM:	613521.3002 mE, 2359404.477 mN
Max Length/Width/Depth:	3.0 m/0.95 m/0.66 m
Orientation:	190°/10° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Keaau stony clay (KmaB)

Setting: Test Excavation 31 (T-031) was located in a parking lot about 4.8 m south of Ualena Street (see Figure 58; Figure 200). The excavation area was level with the surrounding asphalt surface.

Summary of Background Research and Land Use: The location of T-031 was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s. By the 1900s, the railway facilitated plantation development of the area. T-031 was located within former sugar cane “Field 7 ½”of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Honolulu quadrangle), T-031 was about 70 m inland from wetland marsh of the Kaloaloa Pond to the south and east (see Figure 102). The 1943 U.S. Army War Department (Honolulu quadrangle) map shows the immediate vicinity of T-031 as on the edge of undeveloped land around the airport (see Figure 106). According to the 1953 U.S. Army Mapping Service (Puuloa quandrangle) map, the location of T-031 is within the substantial residential subdivision known as “Damon Tract” (see Figure 107).

Documentation Limitations: T-031 was excavated to the coral shelf at a maximum depth of 0.66 mbs. A metal pipe was encountered at the north end at 0.47 mbs, but was not a limiting factor.

Stratigraphic Summary: The stratigraphy consisted of fill strata over natural sediment (Figure 201 and Figure 202). Observed strata included asphalt (Stratum Ia) and associated base course (Stratum Ib) continuous over the excavation area. A utility trench around the metal pipe truncated through the strata in the northern end of T-031, and the fill consisted of crushed coral (Stratum Ic) and very gravelly loam (Stratum Id). The stratigraphy in the remainder of the excavation area consisted of extremely gravelly loam fill (Stratum Ie), and loam fill (Stratum If) overlying natural loam (Stratum II) and the coral shelf. Stratum II generally conformed to the USDA soil survey designation for this location of Keaau stony clay (KmaB). The upper boundary of Stratum II exhibited evidence of previous disturbance.

Figure 200. Photograph of Airport Section 3, T-031, general location, view to east

Figure 201. Photograph of Airport Section 3, T-031, general view of profile, view to southeast

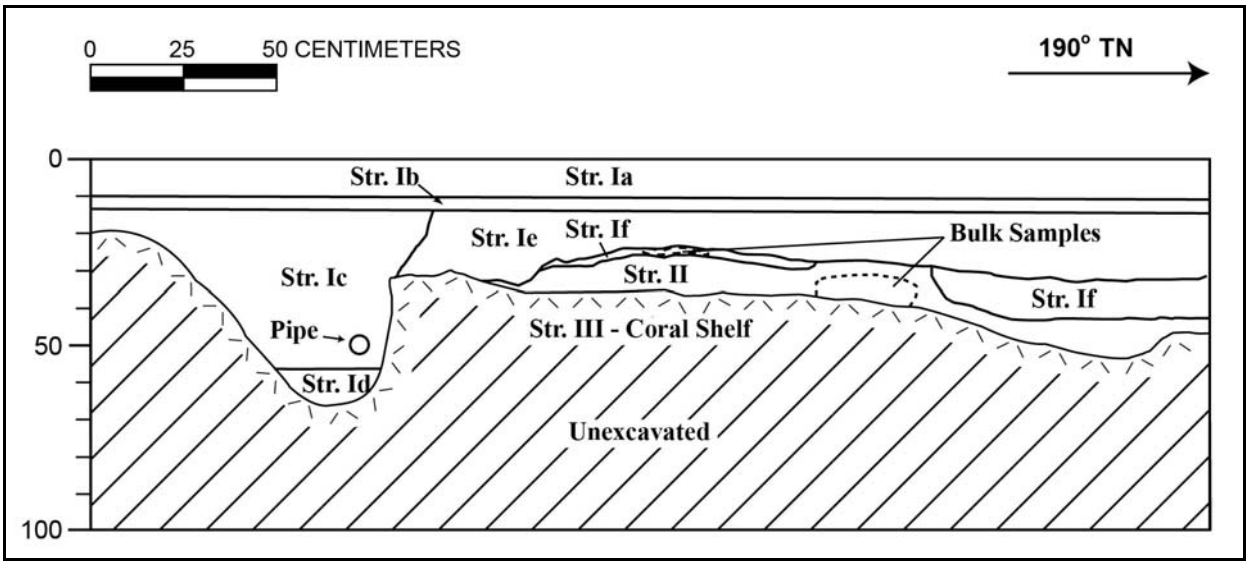


Figure 202. T-031 east profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt; parking lot surface
Ib	10-13	Fill; very gravelly sand; 5Y 8/3, (pale yellow), structureless single-grain; moist; loose consistency; no cementation; non-plastic; marine origin; very abrupt, smooth lower boundary; crushed coral base course
Ic	13-57	Fill; very gravelly loamy sand; 10YR 7/3, (very pale brown); weak, fine crumb structure; moist, loose consistency; no cementation; non-plastic; mixed origin; utility trench containing crushed coral fill around utility line with sandy silt matrix
Id	57-66	Fill; very gravelly loam; 10YR 4/3 (brown); weak, fine-medium, granular structure; moist, very friable consistency; slightly plastic; mixed origin; diffuse, smooth lower boundary; utility line fill
Ie	13-34	Fill; extremely gravelly loam; 10YR 4/4 (dark yellowish brown); weak, fine-medium, crumb structure; moist, very friable consistency; slightly plastic; mixed origin; clear, smooth lower boundary; mixed fill
If	23-30	Fill; loam; 5YR 4/4 (reddish brown) with mottles (30%, thin layers) of 2.5YR 4/6 (red) and (80%, ash-like) 10YR 2/2 (very dark brown); moderate, very fine, crumb structure; moist, friable consistency; slightly plastic; mixed origin; clear, broken/discontinuous lower boundary; contains abundant charcoal fragments and two clear glass fragments (not collected)
II	26-53	Natural; loam; 7.5YR 4/6 (strong brown) with mottles (30%, lattice) of 2.5YR 4/6 (red); moderate, very fine, blocky structure; moist, friable consistency; plastic; terrigenous origin; lower boundary not visible; few very fine roots; natural silty clay loam with disturbance at upper boundary
III	20-66	Natural; coral shelf

Artifact Discussion: Two clear glass fragments were observed in Stratum If, but not collected as no datable attributes were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: A 0.5 liter bulk sediment sample collected from Stratum II between 0.32 mbs and 0.40 mbs yielded no significant material. A 0.25 liter bulk sediment sample collected from Stratum If, between 0.23 mbs and 0.26 mbs, contained charcoal which was submitted for taxa analysis and radiocarbon dating. The charcoal sample was identified as the native Hawaiian shrub/tree of *uhiuhi* (*Caesalpinia kavaiensis*). The wood of the *uhiuhi* was used by Hawaiians for spear-making (see Section 8.4). The sample yielded two date ranges with a calibrated 2 sigma date of 1790 to 1950 AD (52.5%) being the most probable (see Section 8.5).

GPR Discussion: A review of amplitude slice maps did not clearly reflect any linear features although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-031 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile but a utility was encountered during excavation. The maximum depth of clean signal return was about 1.25 mbs.

Summary: T-031 was excavated to the coral shelf at a maximum depth of 0.66 mbs. The stratigraphy consisted of fill strata (Strata Ia-If) over natural sediment (Stratum II) and the coral shelf. Stratum II generally conformed to the USDA soil survey designation of Keaau stony clay (KmaB). A charcoal sample from Stratum If was identified as the native Hawaiian shrub/tree of *uhiuhi* (*Caesalpinia kavaiensis*) dating to the early post-Contact to mid-twentieth century. No cultural resources were identified within T-031.

7.2.32 Test Excavation 32 (T-032)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-016:014
Street:	Waiwai Loop
Owner:	Chevron USA Inc.
Elevation:	2.4 m
UTM:	613922.1063 mE, 2359363.674 mN
Max Length/Width/Depth:	6.75 m/0.72 m/1.33 m
Orientation:	280°/100° TN
Targeted Project Component:	Lagoon Drive Station
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 32 (T-032) was located in the parking lot of a Chevron gas station on the southeast (*makai*/Diamond Head) corner of Waiwai Loop and Lagoon Drive (see Figure 59; Figure 203 and Figure 204).

Summary of Background Research and Land Use: T-032 and nearby T-033, T-034, T-035, and T-036 were all located in the vicinity of the Lagoon Drive Station footprint (see Figure 59 and Figure 203). This location was largely undeveloped prior to the establishment of the OR&L rail line in the late 1800s (see Figure 97). The 1906 Donn map indicates possible cultivation of taro and rice to the northwest of the Lagoon Drive Station location (see Figure 98). This may relate to the identification of *Oryza*-type (rice) pollen in nearby T-033 (see Section 8.4.2). The 1933 U.S. Army War Department Fire Control map of Honolulu shows houses and Kaloaloa Fishpond in this area and several smaller ponds about 250 m to the southwest (see Figure 102). The 1943 U.S. Army War Department map shows 1942-1943 development in the northern part of this area, likely associated with the military (see Figure 106). This map also documents that land reclamation had occurred which extended the coastline more than 500 m to the southeast. In the early 1950s, the Lagoon Drive Station area, including T-032, was developed into a substantial residential subdivision known as “Damon Tract” (see Figure 107).

Documentation Limitations: T-032 was excavated to the coral shelf at a maximum depth of 1.33 mbs. Three utility pipes limited excavation in the east end of T-032.

Stratigraphic Summary: The stratigraphy of T-032 consisted of fill material overtop of natural sediments (Figure 205 and Figure 206). Observed strata were asphalt (Stratum Ia), gravel base course (Stratum Ib), gravelly sandy clay loam (Stratum Ic), and previously disturbed natural sandy clay loam (Stratum II) overlying the coral shelf (Stratum III). Stratum II conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

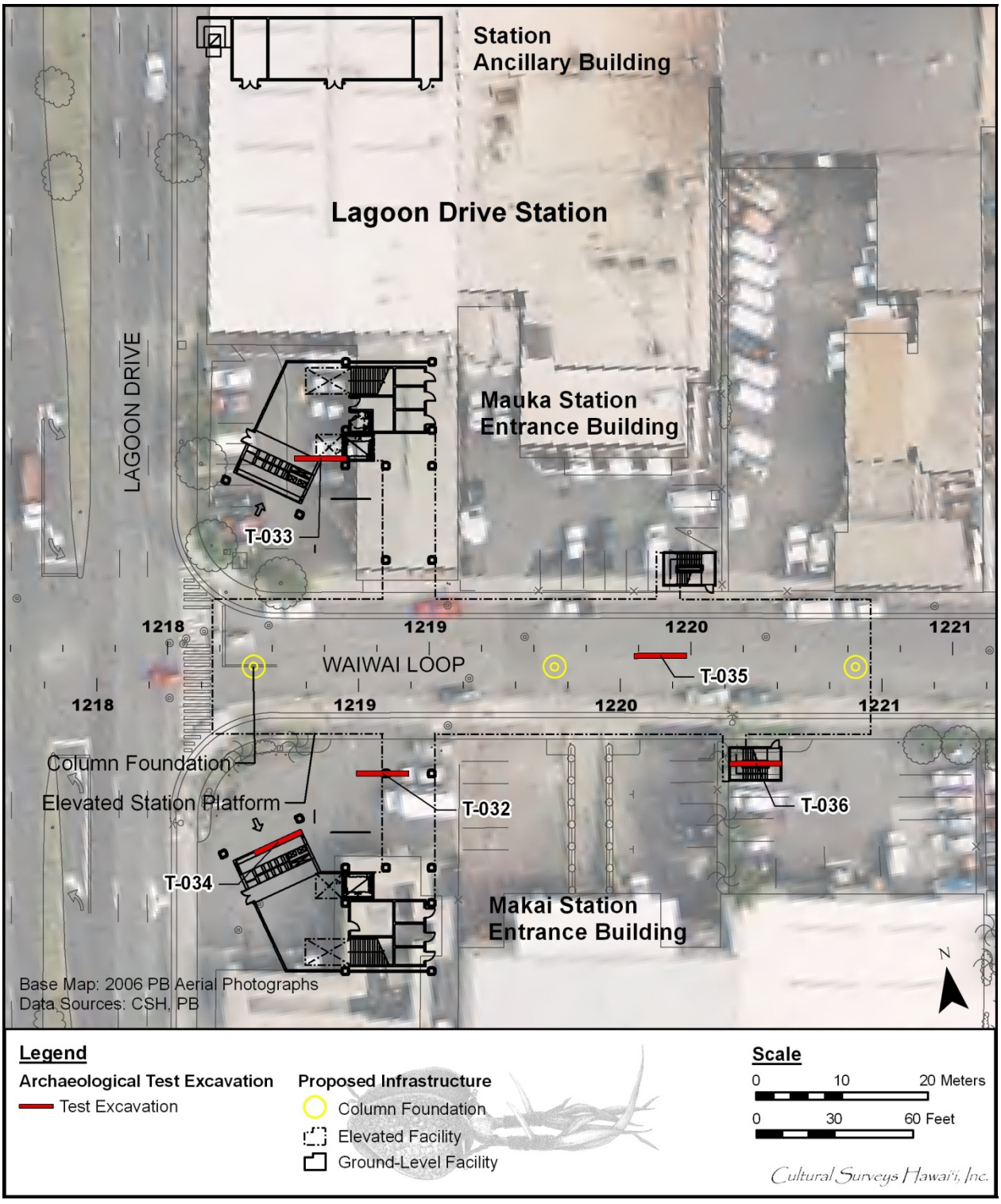
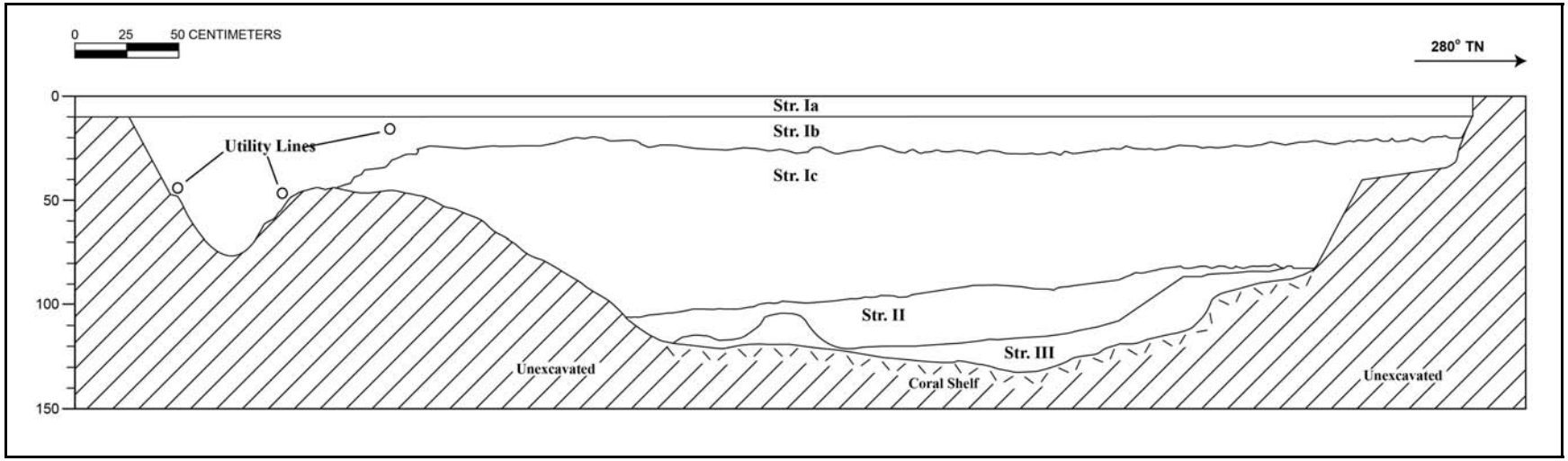


Figure 203. Detail view of Lagoon Drive Station area showing the locations of T-032 through T-036

Figure 204. Photograph of Airport Section 3, T-032, general location, view to north

Figure 205. Photograph of Airport Section 3, T-032, general view of profile, view to southeast



Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-77	Fill; extremely gravelly sand; 10YR 4/3, (brown); structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; contained utility lines; base course
Ic	20-105	Fill; gravelly sandy clay loam; 5YR 4/3 (reddish brown); weak, fine, crumb structure; moist, firm consistency; slightly plastic; terrigenous origin; clear, smooth/sloped lower boundary few very coarse roots
II	82-120	Natural; sandy clay loam; 10YR 3/4 (dark yellowish brown); weak, fine, blocky structure; wet, slightly sticky consistency; slightly plastic; terrigenous origin; clear, wavy lower boundary; few very coarse roots; contains organic staining
III	82-133	Natural; coral shelf

Figure 206. T-032 south profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: A bulk sediment sample of about 2 to 3 liters was collected from Stratum II and yielded small pieces of charcoal (< 0.1 g). The charcoal sample was not sent for wood taxa identification or radiocarbon analysis as it was not from a discrete feature. The results of laboratory analysis indicate no culturally significant material.

GPR Discussion: A review of amplitude slice maps indicated linear features which corresponded to the utilities encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth except for the area that contained utilities. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-032 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.50 mbs. Several anomalies were observed in the GPR profile, which corresponded to the utilities that were encountered during excavation. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-032 was excavated to the coral shelf at a maximum depth of 1.33 mbs. The stratigraphy of T-032 consisted of fill (Strata Ia-Ic) overlying natural sandy clay loam (Stratum II) above the coral shelf (Stratum III). Stratum II conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). No cultural resources were identified within T-032.

7.2.33 Test Excavation 33 (T-033)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-016:015
Street:	Waiwai Loop
Owner:	John V. Brewer Trust
Elevation:	2.6 m
UTM:	613920.4801 mE 2359401.03 mN
Max Length/Width/Depth:	6.4 m/ 0.91 m/1.50 m
Orientation:	130°/310° TN
Targeted Project Component:	Lagoon Drive Station
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 33 (T-033) was located in the Pacific Courier parking lot on the northeast (*mauka*/Diamond Head) corner of Lagoon Drive and Waiwai Loop (see Figure 59 and Figure 203; Figure 207). The area was level with surrounding land surface.

Summary of Background Research and Land Use: T-033 and nearby T-032, T-034, T-035, and T-036 were all located in the vicinity of the Lagoon Drive Station footprint (see Figure 59 and Figure 203). This location was largely undeveloped prior to the establishment of the OR&L rail line in the late 1800s (see Figure 97). By the 1900s, railway and irrigation improvements had facilitated development of the extensive Honolulu Plantation sugar cane fields to the west of T-033. The 1906 Donn map indicates possible cultivation of taro and rice to the northwest of the Lagoon Drive Station location (see Figure 98). This may relate to the identification of *Oryza*-type (rice) pollen in T-033 (see below and Section 8.4.2). The 1933 U.S. Army War Department Fire Control map of Honolulu shows houses and Kaloaloa Fishpond in this area and several smaller ponds about 275 m to the southwest (see Figure 102). The 1943 U.S. Army War Department map shows 1942-1943 development in the northern part of this area, likely associated with the military (see Figure 106). This map also documents that land reclamation had occurred which extended the coastline more than 500 m to the southeast. In the early 1950s, the Lagoon Drive Station area, including T-033, was developed into a substantial residential subdivision known as “Damon Tract” (see Figure 107).

Documentation Limitations: T-033 was excavated to the coral shelf at a maximum depth of 1.5 mbs. An electrical line encountered at 0.60 mbs limited excavation in the northwest end of T-033.

Stratigraphic Summary: The stratigraphy at T-033 consisted of fill overlying natural sediment (Figure 208 and Figure 209). Observed strata were asphalt (Stratum Ia), gravel base course (Stratum Ib), very gravelly sandy loam fill (Stratum Ic), gravelly sandy loam fill (Stratum Id), very gravelly to stony loam fill (Stratum Ie), and natural silty clay loam (Stratum II) above the coral shelf (Stratum III). Stratum II conformed with the USDA soil survey designation of Ewa clay loam (EmA)

Figure 207. Photograph of Airport Section 3, T-033, general location, view to southeast

Figure 208. Photograph of Airport Section 3, T-033, general view of profile, view to north

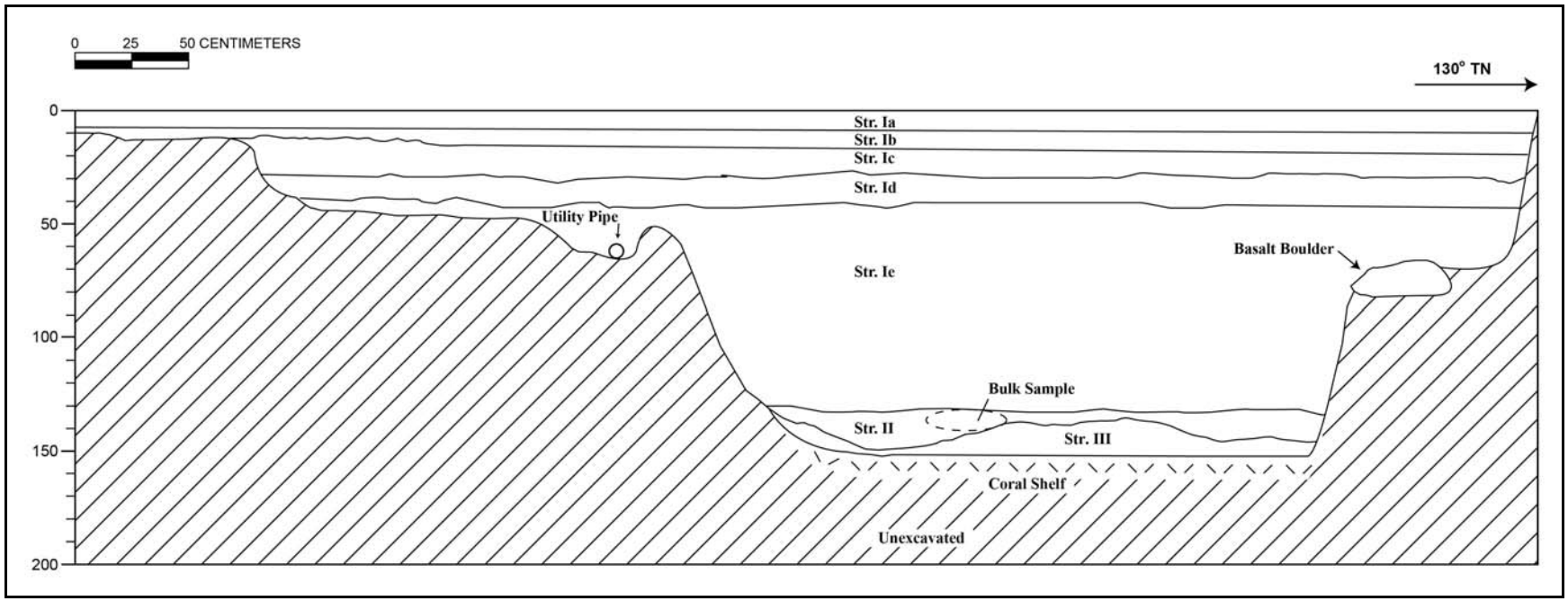


Figure 209. T-033 northeast profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-9	Asphalt
Ib	9-19	Fill; extremely gravelly loam; 10YR 6/1 (gray); weak, fine to medium, blocky structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	19-29	Fill; very gravelly sandy loam; 5YR 4/4 (reddish brown); weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary
Id	29-40	Fill; gravelly sandy loam; 10YR 4/2 (dark grayish brown); weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contained a thin band of asphalt near upper boundary
Ie	40-128	Fill; very gravelly to stony loam; 5YR 3/4 (dark reddish brown); weak, fine to medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; contained large angular basalt boulders and a butchered cow rib
II	128-148	Natural; silty clay loam; 10YR 4/4 (dark yellowish brown); weak, medium, blocky structure; moist, firm consistency; slightly plastic; terrigenous origin; charcoal flecking observed; Ewa clay loam (EmA)
III	135-150	Natural; Limestone; marine origin, lower boundary not visible; undulating coral shelf

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: A cow (*Bos taurus*) rib portion was observed in Stratum Ie at 0.45 mbs, near the center of the excavation. The rib exhibited cut marks characteristic of butchered food remains.

Lab Results: A 2.5 liter bulk sediment sample was collected from Stratum II between 1.28-1.39 mbs. A portion of the sediment sample was submitted for pollen analysis. The remainder of the sample was wet screened and yielded no cultural material. The pollen analysis identified Cheno-am pollen, probably reflecting primarily *Chenopodium oahuense* (*‘āheahea*) throughout most of the sample. Additional pollen types indicated trees from a coastal location, including *koa* (a sumac), coconut, and *hō‘awa* and *loulu* palms, and several types of pollen indicating shrubby vegetation. The total pollen concentration was moderately high at about 8500 pollen per cc of sediment, which is more typical of a wetland than a terrestrial deposit (see Section 8.2.7).

GPR Discussion: A review of amplitude slice maps indicated a linear feature which corresponds to the utility encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-033 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. An anomaly was observed in the GPR profile and corresponded to the utility encountered during excavation. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-033 was excavated to the coral shelf at a maximum depth of 1.5 mbs. The stratigraphy of T-033 consisted of fill (Strata Ia-Ie) overlying natural silty clay loam (Stratum II) and the coral shelf (Stratum III). Stratum II conformed to the USDA soil survey designation of Ewa clay loam (EmA). A butchered cow (*Bos taurus*) rib was observed in Stratum Ie. Charcoal flecking was observed in Stratum II. A pollen analysis from Stratum II indicated a moderately high concentration of pollen in the sediment, which is more typical of a wetland than a dry deposit. The Donn 1906 map indicates a wetland agriculture area occured northwest of this location.

7.2.34 Test Excavation 34 (T-034)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-016: 014
Street:	Waiwai Loop
Owner:	Chevron USA Inc.
Elevation:	2.7 m
UTM:	613908.8522 mE, 2359357.551 mN
Max Length/Width/Depth:	6.73 m/0.65 m/1.51 m
Orientation:	76°/256° TN
Targeted Project Component:	Lagoon Drive Station
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 34 (T-034) was located in a Chevron gas station parking lot on the southeast (*makai*/Diamond Head) corner of Waiwai Loop and Lagoon Drive (see Figure 59 and Figure 203; Figure 210). The excavation area was level with the surrounding surface.

Summary of Background Research and Land Use: T-034 and nearby T-032, T-033, T-035, and T-036 were all located in the vicinity of the Lagoon Drive Station footprint (see Figure 59 and Figure 203). This location was largely undeveloped prior to the establishment of the OR&L rail line in the late 1800s (see Figure 97). The 1906 Donn map indicates possible cultivation of taro and rice to the northwest of the Lagoon Drive Station location (see Figure 98). This may relate to the identification of *Oryza*-type (rice) pollen in nearby T-033 (see Section 8.4.2). The 1933 U.S. Army War Department Fire Control map of Honolulu shows houses and Kaloaloa Fishpond in this area and several smaller ponds about 230 m to the southwest (see Figure 102). The 1943 U.S. Army War Department map shows 1942-1943 development in the northern part of this area, likely associated with the military (see Figure 106). This map also documents that land reclamation had occurred which extended the coastline more than 500 m to the southeast. In the early 1950s, the Lagoon Drive Station area, including T-034, was developed into a substantial residential subdivision known as “Damon Tract” (see Figure 107).

Documentation Limitations: T-034 was excavated to the coral shelf at a maximum depth of 1.51 mbs. There were no specific factors that limited documentation of T-034.

Stratigraphic Summary: The stratigraphy consisted of fill strata overlying natural sediment (Figure 211 and Figure 212). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), and very gravelly loam fill (Stratum Ic) overlying natural clay loam (Stratum II) natural sandy clay loam (Stratum III), and decomposing coral shelf (Stratum IV) above the coral shelf. Stratum II conforms to the USDA soil survey designation of Ewa silty clay loam (EmA).

Artifact Discussion: No artifacts were observed.

Figure 210. Photograph of Airport Section 3, T-034, general location, view to northwest

Figure 211. Photograph of Airport Section 3, T-034, general view of profile, view to northeast

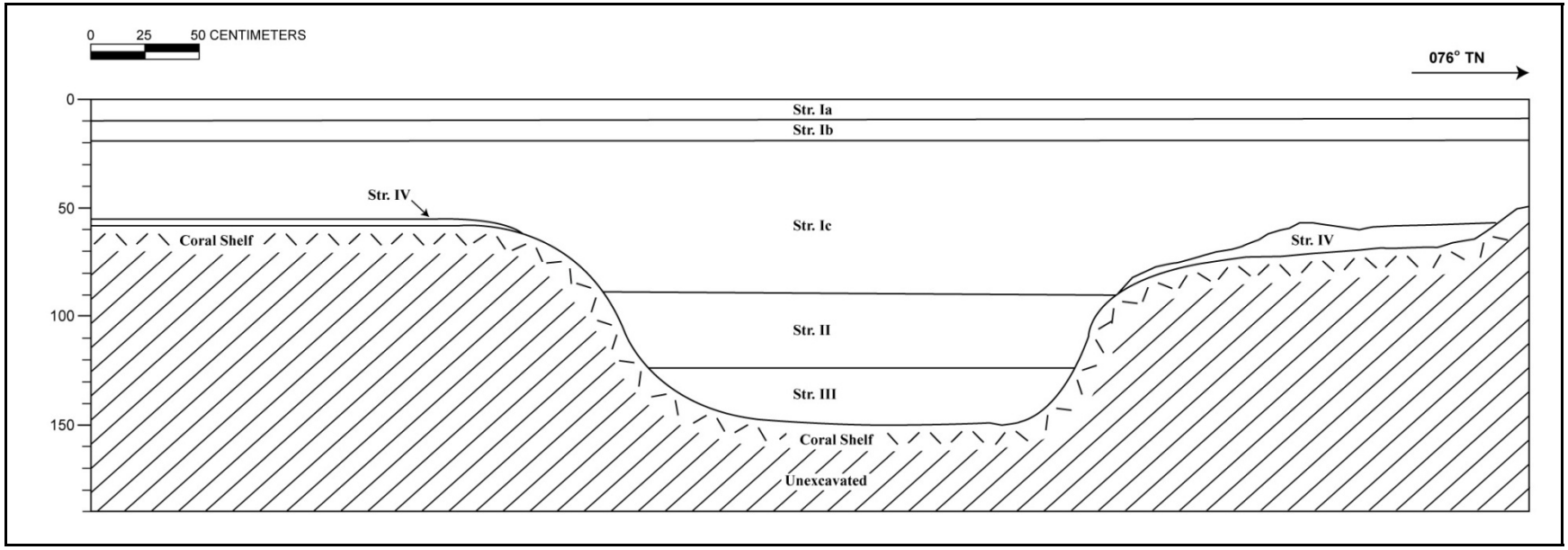


Figure 212. T-034 north profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	10-20	Fill; very gravelly sandy loam; 10YR 4/2 (dark grayish brown); structureless; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	19-52	Fill; very gravelly loam; 5YR 4/3 (reddish brown); structureless; dry, loose consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; contains chunks of concrete, asphalt, and coral; grading fill
II	85-126	Natural; clay loam; 10YR 4/3 (dark brown); weak, medium, blocky (subangular) structure; moist, friable consistency; plastic; terrigenous origin, a trace (< 0.1 g) of non-diagnostic fish bone was observed; clear, smooth lower boundary
III	124-151	Natural; gravelly sandy clay loam; 7.5YR 5/4 (brown) with mottles of 10YR 4/2 (dark grayish brown); weak, fine, blocky (subangular) structure; moist, loose consistency; plastic; mixed origins; contains 20% fine coral gravels
IV	55-85	Natural; decomposing coral shelf; 10YR 8/2 (very pale brown); massive structure; indurated; non-plastic; marine origin; over coral shelf

Feature Discussion: No features were observed.

Faunal Remains Discussion: A trace (< 0.1 g) of non-diagnostic fish bone was observed in Stratum II.

Lab Results: A 2 gallon bulk sediment sample collected from Stratum II yielded no cultural material.

GPR Discussion: A review of amplitude slice maps indicated no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-034 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area (see Appendix E). This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.40 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.15 mbs

Summary: T-034 was excavated to the coral shelf at a maximum depth of 1.51 mbs. The stratigraphy of T-034 consisted of fill (Stratum Ia to Ic), overlying natural clay loam (Stratum II), sandy clay loam (Stratum III) and decomposing coral shelf (Stratum IV) above the coral shelf. Stratum II conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). The thickness of Stratum II may relate to alluvial deposition at the mouths of the Moanalua, Kahauiki, and Kalihi Streams. No cultural resources were identified within T-034.

7.2.35 Test Excavation 35 (T-035)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-016 [Plat]
Street:	Waiwai Loop
Owner:	City & County of Honolulu
Elevation:	2.5 m
UTM:	613956.1524 mE, 2359372.351 mN
Max Length/Width/Depth:	7.35 m/0.70 m/1.80 m
Orientation:	270°/90° TN
Targeted Project Component:	Lagoon Drive Station
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 35 (T-035) was located on the south (*makai*) side of Waiwai Loop, about 50 m east of Lagoon Drive (see Figure 59 and Figure 203; Figure 213). The excavation area was level with the surrounding surface.

Summary of Background Research and Land Use: T-035 and nearby T-032, T-033, T-034, and T-036 were all located in the vicinity of the Lagoon Drive Station footprint (see Figure 59 and Figure 203). This location was largely undeveloped prior to the establishment of the OR&L rail line in the late 1800s (see Figure 97). The 1906 Donn map indicates possible cultivation of taro and rice to the northwest of the Lagoon Drive Station location (see Figure 98). This may relate to the identification of *Oryza*-type (rice) pollen in nearby T-033 (see Section 8.4.2). The 1933 U.S. Army War Department Fire Control map of Honolulu shows houses and Kaloaloa Fishpond in this area and several smaller ponds about 275 m to the southwest (see Figure 102). The 1943 U.S. Army War Department map shows 1942-1943 development in the northern part of this area, likely associated with the military (see Figure 106). This map also documents that land reclamation had occurred which extended the coastline more than 500 m to the southeast. In the early 1950s, the Lagoon Drive Station area, including T-035, was developed into a substantial residential subdivision known as “Damon Tract” (see Figure 107).

Documentation Limitations: T-035 was excavated to the coral shelf at a depth of 1.80 mbs. There were no specific factors that limited documentation of T-035.

Stratigraphic Summary: The stratigraphy at T-035 consisted of fill material overlying natural sediment (Figure 214 and Figure 215). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), very gravelly silty clay fill (Stratum Ic), very gravelly silty clay fill (Stratum Id), and very cobbly silty clay fill (Stratum Ie) overlying natural silty clay (Stratum II) and decomposing coral shelf (Stratum III) above the coral shelf. Stratum II conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Figure 213. Photograph of Airport Section 3, T-035, general location, view to northwest

Figure 214. Photograph of Airport Section 3, T-035, general view of profile, view to southeast

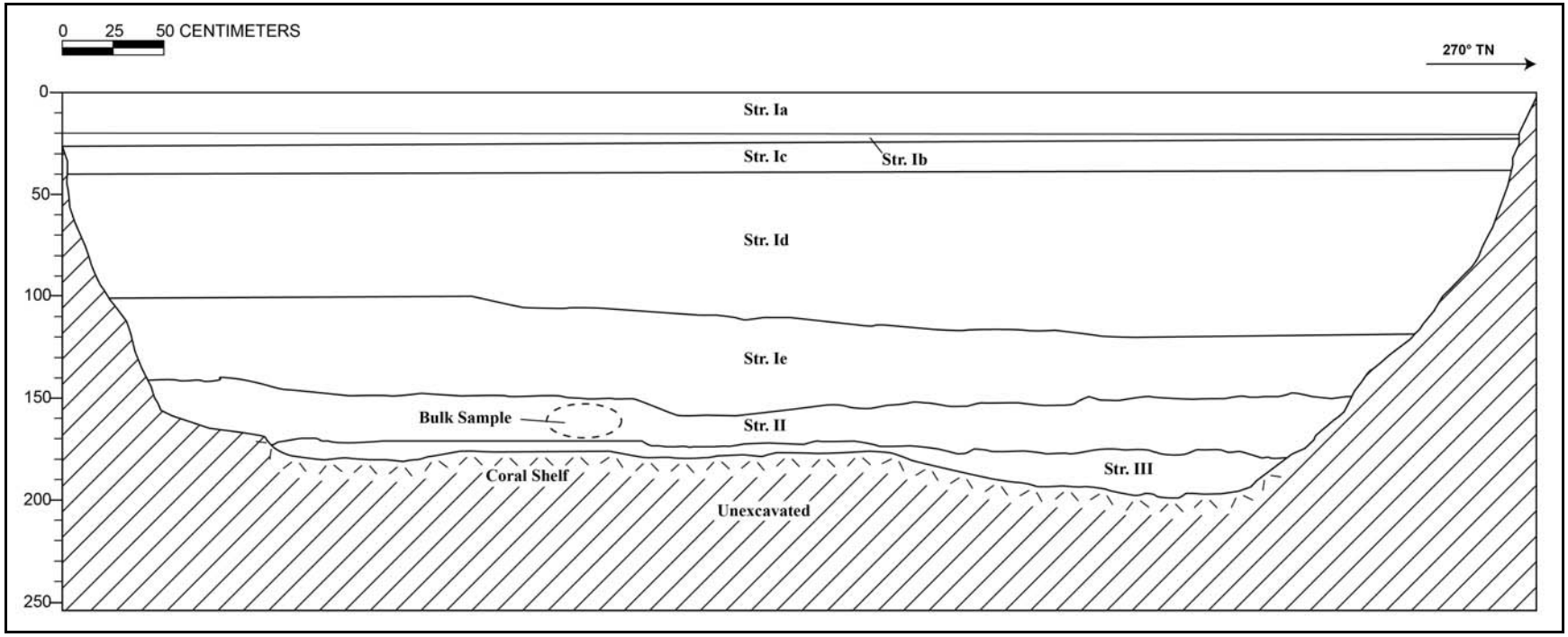


Figure 215. T-035 south wall profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-25	Asphalt pavement
Ib	20-27	Fill; extremely gravelly silty sand; 10YR 3/2 (very dark gray brown); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; gravel base course
Ic	25-42	Fill; very gravelly silty clay; 10YR 3/4 (dark yellow brown); weak, medium, blocky structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; imported fill material deposited to raise grade
Id	37-120	Fill; very gravelly silty clay; 5YR 3/3 (dark reddish brown); weak, medium, blocky structure; moist, firm consistency; plastic; mixed origin; abrupt, smooth lower boundary; imported fill used to raise surface
Ie	100-157	Fill; very cobbly silty clay; 10YR 3/3 (dark brown) mottled with 50% very coarse 10YR 8/1 (white); weak, medium, coarse, blocky structure; moist, firm consistency; plastic; terrigenous origin; abrupt, wavy lower boundary; disturbed, redeposited mixture of underlying Strata II and III, containing 50% coral cobbles
II	140-180	Natural; silty clay; 10YR 4/4 (dark yellow brown); structureless, massive; moist, very firm consistency; non-plastic; terrigenous origin; abrupt smooth lower boundary; natural alluvial deposit, Ewa silty clay loam (EmA); sample contained marine shell including *Brachidontes crebristriatus*
III	168-200	Natural; decomposing coral shelf; 10YR 8/2 (very pale brown); structureless, single-grain; indurated; non-plastic; marine origin; over coral shelf

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains were observed.

Lab Results: A 1 liter bulk sediment sample collected from Stratum II between 1.45-1.73 mbs yielded a trace (< 0.1 g) of marine shell including *Brachidontes crebristriatus.* This material appears to have been naturally deposited.

GPR Discussion: A review of amplitude slice maps indicated no linear features, which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-035 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. An anomaly was observed in the GPR profile but was not observed during excavation. The maximum depth of clean signal return was about 0.80 mbs.

Summary: T-035 was excavated to the coral shelf at a depth of 1.80 mbs. The stratigraphy of T-035 consisted of fill (Strata Ia-Ie) overlying natural silty clay (Stratum II) and decomposing coral shelf (Stratum III). Stratum II conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). No cultural resources were identified within T-035.

7.2.36 Test Excavation 36 (T-036)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-006:012
Street:	Waiwai Loop
Owner:	Window World, Inc.
Elevation:	2.6 m
UTM:	613965.2562 mE, 2359358.286 mN
Max Length/Width/Depth:	7.35 m/0.70 m/2.20 m
Orientation:	92°/272° TN
Targeted Project Component:	Lagoon Drive Station
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 36 (T-036) was located on the south (*makai*) side of Waiwai Loop in the paved parking lot fronting Window World, Inc. (see Figure 59 and Figure 203; Figure 216). The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: T-036 and nearby T-032, T-033, T-034, and T-035 were all located in the vicinity of the Lagoon Drive Station footprint (see Figure 59 and Figure 203). This location was largely undeveloped until the creation of the OR&L railway in the late 1800s (see Figure 97). The 1906 Donn map indicates that there may have been an area of taro or rice agriculture to the northwest of the Lagoon Drive Station location (see Figure 98). This may relate to the identification of *Oryza*-type (rice) pollen in nearby T-033 (see Section 8.4.2). The 1933 U.S. Army War Department Fire Control map of Honolulu shows a number of houses in this area with Kaloaloa Fishpond about 275 m to the southwest (see Figure 102). The 1943 U.S. Army War Department map shows 1942-1943 development in the northern part of this area, likely associated with the military (see Figure 106). It also documents the land reclamation that occurred to the south with the coastline having been pushed out more than 500 m to the southeast. In the early 1950s, the Lagoon Drive Station area, including T-036, was developed into a substantial residential subdivision called “Damon Tract” (see Figure 107).

Documentation Limitations: T-036 was excavated to the coral shelf at 2.05 mbs. There were no specific factors that limited documentation.

Stratigraphic Summary: The stratigraphy of T-036 consisted of fill strata over natural sediment (Figure 217 and Figure 218). Observed strata were asphalt (Stratum Ia) and associated base course (Stratum Ib), a buried asphalt pavement (Stratum Ic), associated base course (Stratum Id), clay fill (Stratum Ie), and very gravelly to cobbly loam (Stratum If), overlying natural clay (Stratum II) to the coral shelf (Stratum III). The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Figure 216. Photograph of Airport Section 3, T-036, general location, view to southeast

Figure 217. Photograph of Airport Section 3, T-036, general view of profile, view to southwest

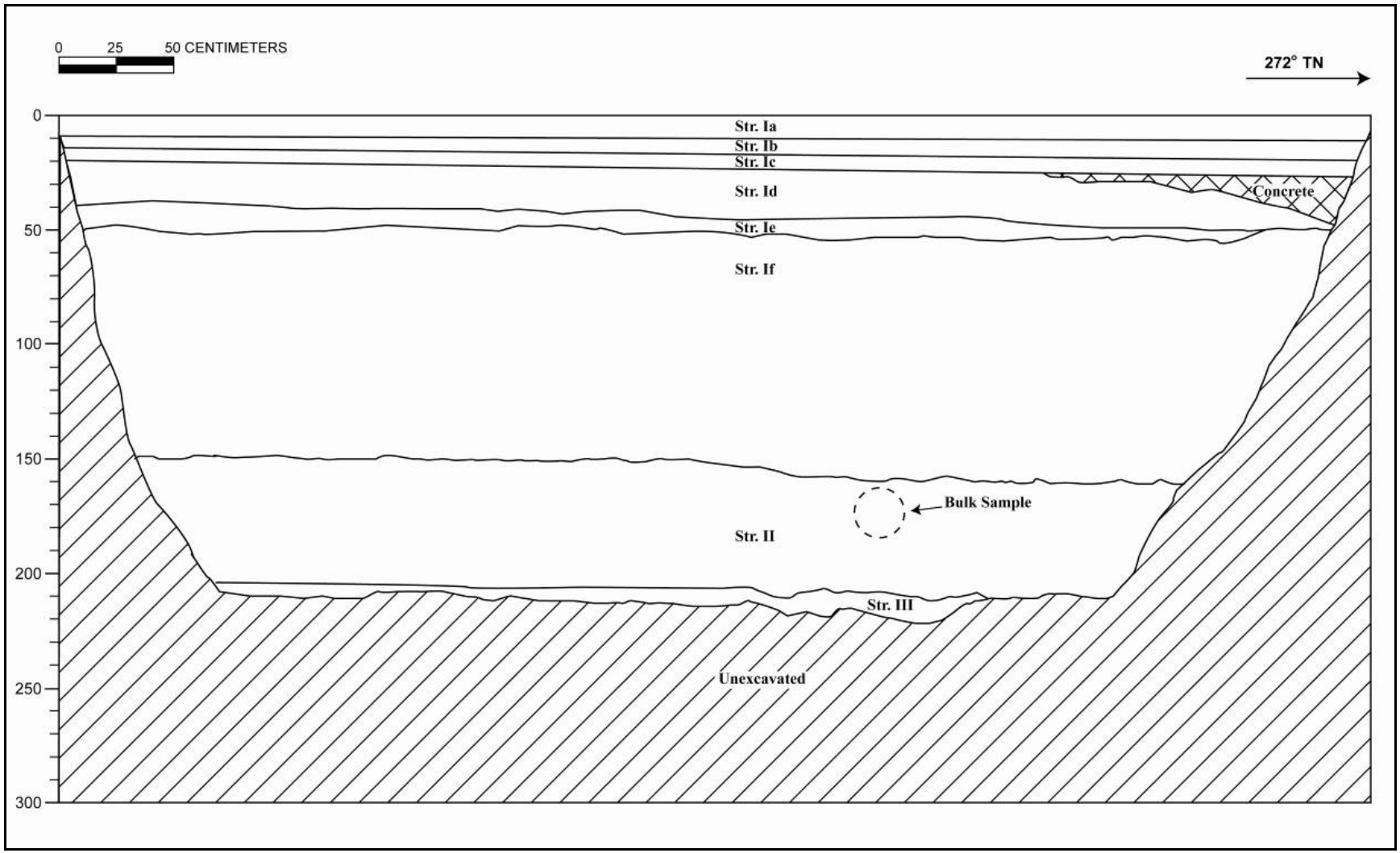


Figure 218. T-036 south profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-10	Asphalt
Ib	8-20	Fill; extremely gravelly loamy sand; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	15-25	Asphalt; 5YR 2/1 (black); buried asphalt layer
Id	20-50	Fill; extremely gravelly loamy sand; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; many fine to medium roots; basalt gravel base course; contained a concrete slab
Ie	40-55	Fill; clay; 10YR 4/4 (dark yellowish brown); moderate, coarse, blocky structure; moist, friable consistency; plastic; terrigenous origin; abrupt, smooth lower boundary; locally procured clay fill material
If	48-160	Fill; very gravelly to cobbly loam; 10YR 3/4 (dark yellowish brown); structureless, single-grain; moist, very friable consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; few fine roots
II	150-210	Natural; clay; 10YR 4/4 (dark yellowish brown); moderate, coarse, blocky structure; moist, friable consistency; terrigenous origin; very abrupt, smooth lower boundary; natural alluvial sediment, Ewa silty clay loam (EmA)
III	205-212	Natural; limestone; 10YR 8/1 (white); massive structure; very hard consistency; marine origin; lower boundary not visible; coral shelf

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: A 2 liter bulk sediment sample was collected from Stratum II between 1.6 mbs and 1.85 mbs. The sample yielded very little organic filaments and no cultural material.

GPR Discussion: A review of amplitude slice maps revealed a linear feature which suggested the presence of utilities (see Appendix E), but no utilities were encountered during the excavation of T-036. Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs

GPR depth profiles for T-036 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.50 mbs and again around 0.75 mbs. An anomaly was observed in the profile but was not encountered while excavating. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-036 was excavated to the coral shelf at 2.05 mbs. The stratigraphy consisted of fill strata (Strata Ia-If) over natural sediment (Stratum II) and the coral shelf (Stratum III). The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). A bulk sediment sample from Stratum II yielded no significant findings.

7.2.37 Test Excavation 37 (T-037)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-016:006
Street:	Waiwai Loop
Owner:	Alert Holdings Group, Inc.
Elevation:	2.8 m
UTM:	614156.2492 mE, 2359341.335 mN
Max Length/Width/Depth	3.00 m/0.70 m/1.32 m
Orientation:	156°/336° TN
Targeted Project Component:	Systems Site Facility
USDA Soil Designation:	Ewa silty clay loam (EmA)

Setting: Test Excavation 37 (T-037) was located in a parking lot on the southeast (*makai*/Diamond Head) side of Waiwai Loop at the Systems Site Facility footprint (see Figure 60; Figure 219). The excavation area was level with the surrounding land surface.

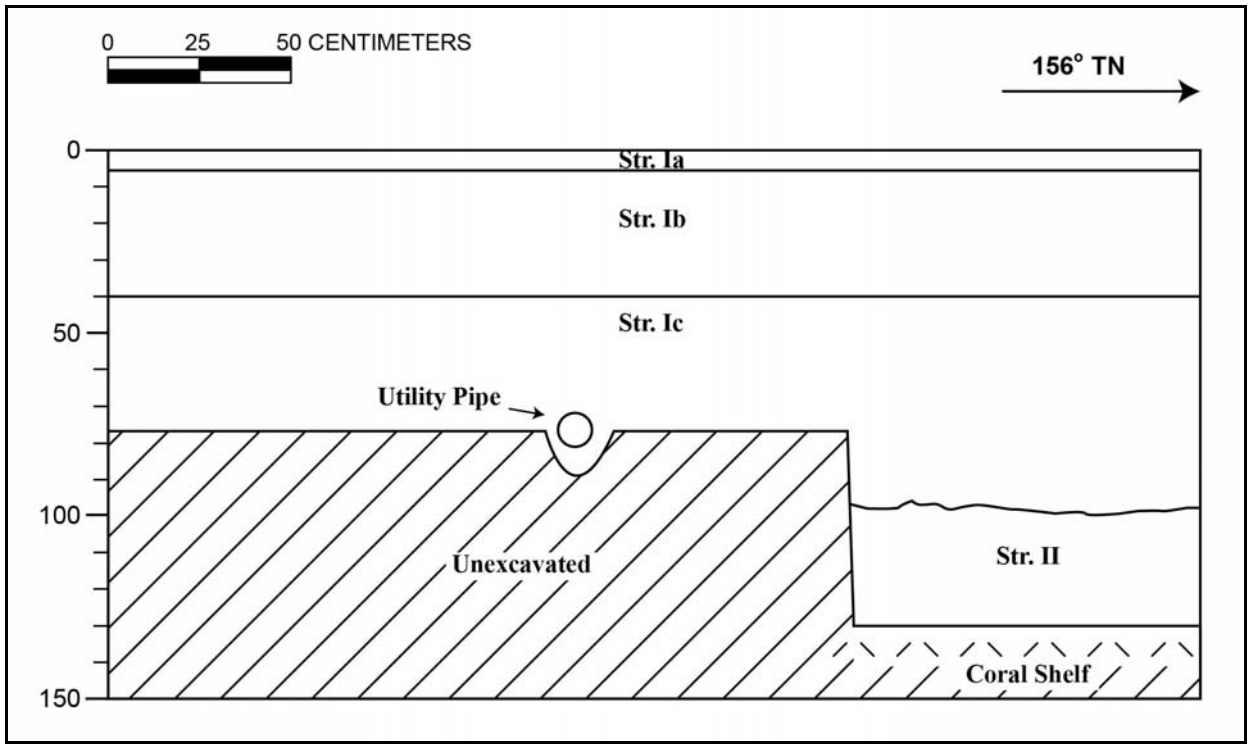
Summary of Background Research and Land Use: According to the 1890 Monsarrat and Lyons Moanalua and Kahauiki map, T-037 is located on the east end of a former sandy point extending east into Moanalua Bay (Ke‘ehi Lagoon) (see Figure 96). While no early development (e.g., roads, structures, etc.) is indicated at this specific location, the region around the bay was a highly developed traditional cultural landscape with Kaloaloa Pond less than 500 m to the southwest, Ahua Fishpond beginning about 175 m to the north with Awaawaloa Fishpond and Māpunapuna Fishpond adjacent to it (see also Figure 100). The area also was supported by the confluence of Moanalua Stream, Kahauiki Stream, and Kalihi Stream with many additional fishponds, extensive shallows, and the off-shore islet of Mokuoniki. The OR&L railroad initially arced around the inland margins of Ke‘ehi Lagoon, but by 1919 a causeway had been developed to carry the rail line straight across the bay about 250 m north of T-037 (see Figure 100). Between 1933 and 1943, extensive fill activities pushed the coastline nearly 500 m to the southeast (see Figure 102 and Figure 106)

Documentation Limitations: T-037 was excavated to the coral shelf at a maximum depth of 1.32 mbs. Due to the potential for PCB contamination no samples were collected and a Tyvek coverall suit and respirator was required to enter T-037. A PVC utility line was exposed at 0.76 mbs which limited excavation in the northern half of T-037.

Stratigraphic Summary: The stratigraphy of T-037 consisted of fill strata over natural sediment (Figure 220 and Figure 221). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), and gravelly cobbly loam (Stratum Ic), overlying natural sandy clay loam (Stratum II) above the coral shelf. The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA).

Figure 219. Photograph of Airport Section 3, T-037, general location, view to southeast

Figure 220. Photograph of Airport Section 3, T-037, general view of profile, view to southeast



Stratum	Depth (cmbs)	Description
Ia	0-5	Asphalt
Ib	5-10	Fill, gravel; 10YR 4/2 (dark grayish brown); structureless, single-grain; moist, friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; few fine roots; basalt gravel base course
Ic	40-97	Fill; gravelly cobbly loam; 5YR 3/4 (dark reddish brown); weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contains a 3” PVC utility line
II	97-132	Natural; sandy clay loam; 10YR 3/4 (dark yellowish brown); weak, fine, blocky structure; moist, friable to firm consistency; plastic; terrigenous origin; abrupt, lower boundary not visible; Ewa silty clay loam (EmA) overlying the coral shelf

Figure 221. T-037 southwest profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps did not clearly reveal any linear features, although a utility pipe was encountered during the excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-037 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.40 mbs. An anomaly was observed in the GPR profile that corresponded to the utility, which was encountered during excavation. The maximum depth of clean signal return was about 0.90 mbs.

Summary: T-037 was excavated to the coral shelf at a maximum depth of 1.32 mbs. The stratigraphy of T-037 consisted of fill strata (Strata Ia-Ic) over natural sediment (Stratum II). The stratigraphy generally conformed to the USDA soil survey designation of Ewa silty clay loam (EmA). No cultural resources were identified.

7.2.38 Test Excavation 38 (T-038)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:006
Street:	Ke‘ehi Lagoon Park Road
Owner:	State DOT Airports Division
Elevation:	2.7 m
UTM:	614233.2311 mE, 2359342.742 mN
Max Length/Width/Depth:	4.10 m/1.05 m/2.70 m
Orientation:	218°/38° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 38 (T-038) was located in a grassy area of Ke‘ehi Lagoon Park, near the northward turn of Waiwai Loop and about 60 m east of the Systems Station Facility footprint (see Figure 60; Figure 222). The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: According to the 1890 Monsarrat and Lyons Moanalua and Kahauiki map, T-038 is located on the east end of a former sandy point extending east into Moanalua Bay (Ke‘ehi Lagoon) (see Figure 96). While no early development (e.g., roads, structures, etc.) is indicated at this specific location, the region around the bay was a highly developed traditional cultural landscape with Kaioaloa Pond about 510 m to the southwest, Ahua Fishpond beginning about 155 m to the north with Awaawaloa Fishpond and Māpunapuna Fishpond adjacent to it (see Figure 100). The area also was supported by the confluence of Moanalua Stream, Kahauiki Stream, and Kalihi Stream with many additional fishponds, extensive shallows, and the off-shore islet of Mokuoniki. The OR&L railroad initially arced around the inland margins of Ke‘ehi Lagoon, but by 1919 a causeway had been developed to carry the rail line straight across the bay about 250 m north of T-038 (see Figure 100). Between 1933 and 1943, extensive fill activities pushed the coastline nearly 500 m to the southeast (see Figure 102 and Figure 106).

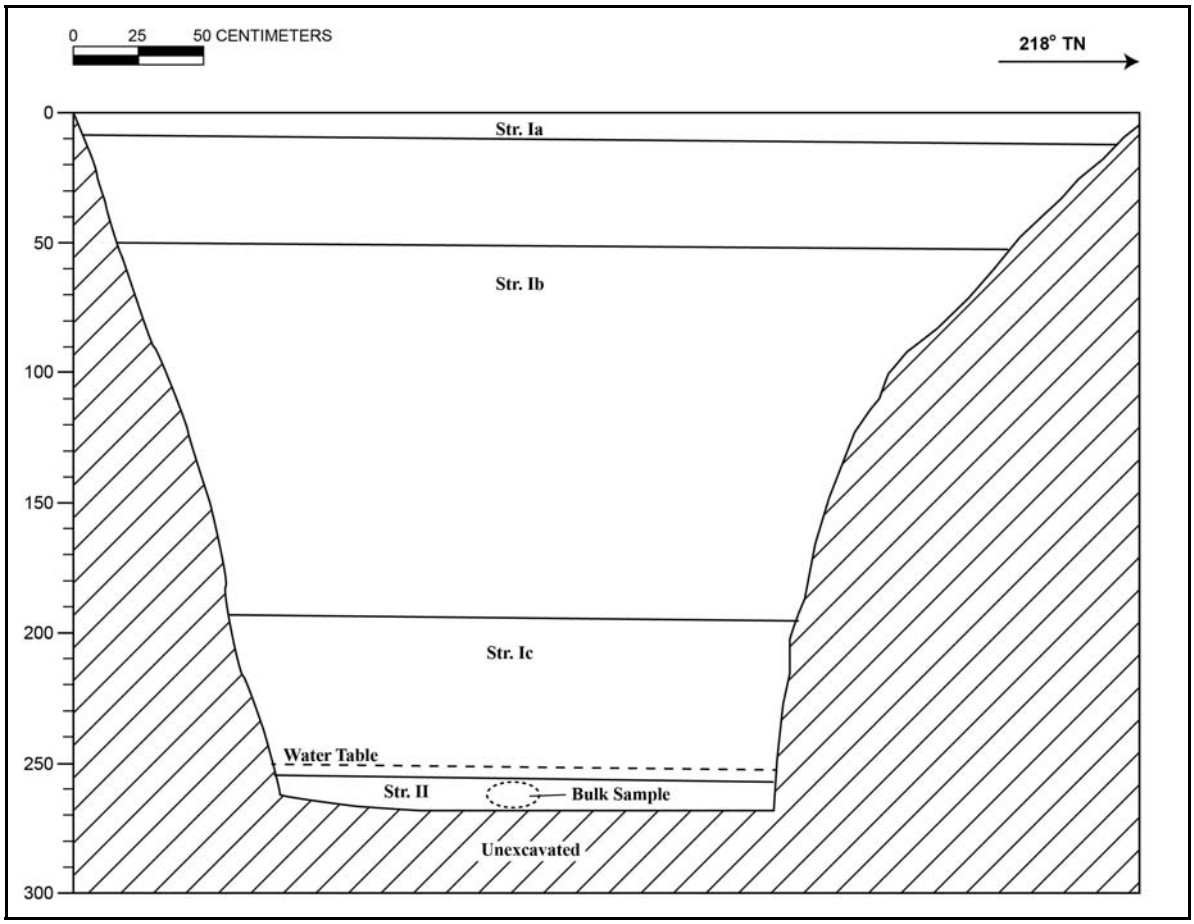
Documentation Limitations: T-038 was excavated to a depth of 2.70 mbs in natural sediment and beneath the water table at 2.53 mbs. There were no specific factors that limited documentation of T-038.

Stratigraphic Summary: The stratigraphy of T-038 consisted of fill strata over natural sediment (Figure 223 and Figure 224). Observed strata were topsoil (Stratum Ia), crushed coral fill (Stratum Ib), and hydraulic fill (Stratum Ic) overlying natural sandy clay (Stratum II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were collected during the excavation of T-038. See lab results below for bulk sample contents.

Figure 222. Photograph of Airport Section 3, T-038, general location, view to northeast

Figure 223. Photograph of Airport Section 3, T-038, general view of profile, view to southeast



Stratum	Depth (cmbs)	Description
Ia	0-9	Top soil; silt loam; 10YR 2/4 (dark yellowish brown); weak, fine, crumb structure; moist, very friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; very fine to fine roots common; topsoil with grass
Ib	9-195	Fill, very gravelly sand; 10YR 7/3 (very pale brown); structureless, single-grain; moist; loose consistency; non-plastic; marine origin; very abrupt, smooth lower boundary; few fine roots; crushed coral fill
Ic	195-258	Fill; silt loam; 2.5Y 7/2 (light gray); structureless, massive; moist, friable consistency; slightly plastic; mixed origin; very abrupt, smooth lower boundary; fine roots common; hydraulic fill with oxidized root remnants and marine shell
II	258-270	Natural; sandy clay; Gley 10Y 6/1 (greenish gray) mottled with (5% blocks) of 10YR 3/1 (very dark gray) and (30% blocks) of 2.5Y 4/2 (dark grayish brown); structureless, massive; wet, sticky consistency; plastic; mixed origin; previously disturbed; contained marine shell

Figure 224. T-038 southeast profile and stratigraphic description

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed during the excavation of T-038. See lab results below for bulk sample contents.

Lab Results: A total of 3.5 liters of bulk sediment samples were collected from Stratum II (natural sandy clay). A 2 liter bulk sediment sample was collected from the backhoe bucket, from about 2.59 mbs and 2.69 mbs and yielded a small amount of charcoal (1.4 g), marine shell (8.5 g), unidentified fish bone (0.6 g), historic wood pieces (144.4 g), and a rusted metal fragment (13.9 g) (see Section 8.2.11). A 1.5 liter bulk sediment sample was collected from Stratum II between 2.60 mbs and 2.70 mbs and yielded small quantities of fragmentary bivalvia, gastropods, and a crab claw (< 0.1 g each) (see Section 8.2.11). The charcoal sample was not sent for wood taxa identification or radiocarbon analysis as it was not from a discrete feature. The results of laboratory analysis indicate material reflecting traditional Hawaiian consumption patterns, but the presence of metal and wood in the collection below the water table may represent historic intrusions.

GPR Discussion: A review of amplitude slice maps revealed no linear features, which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-038 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.15 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.00 mbs.

Summary: T-038 was excavated to a maximum depth of 2.70 mbs in natural sediment and beneath the water table at 2.53 mbs. The stratigraphy of T-038 consisted of fill strata (Strata Ia-Ic) over natural sediment (Stratum II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The results of laboratory analysis indicated faunal material reflecting traditional Hawaiian consumption patterns, but the presence of metal and wood encountered below the water table may represent historic intrusions or indicate deposition continued well into the historic period.

7.2.39 Test Excavation 39 (T-039)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:006
Street:	Ke‘ehi Lagoon Park Road
Owner:	State DOT Airports Division
Elevation:	1.7 m
UTM:	614461.9737 mE 2359446.383 mN
Max Length/Width/Depth:	4.40 m/0.97 m/2.0 m
Orientation:	103°/283° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 39 (T-039) was located in the grassy lawn of Ke‘ehi Lagoon Park, about 52.0 m north of the parking lot, about 74.0 m east of the tennis courts, and 290.0 m southwest of the Senator Daniel K. Inouye Drive and Nimitz Highway intersection (see Figure 61; Figure 225). The excavation area was slightly elevated above the parking lot but slightly lower than surrounding areas.

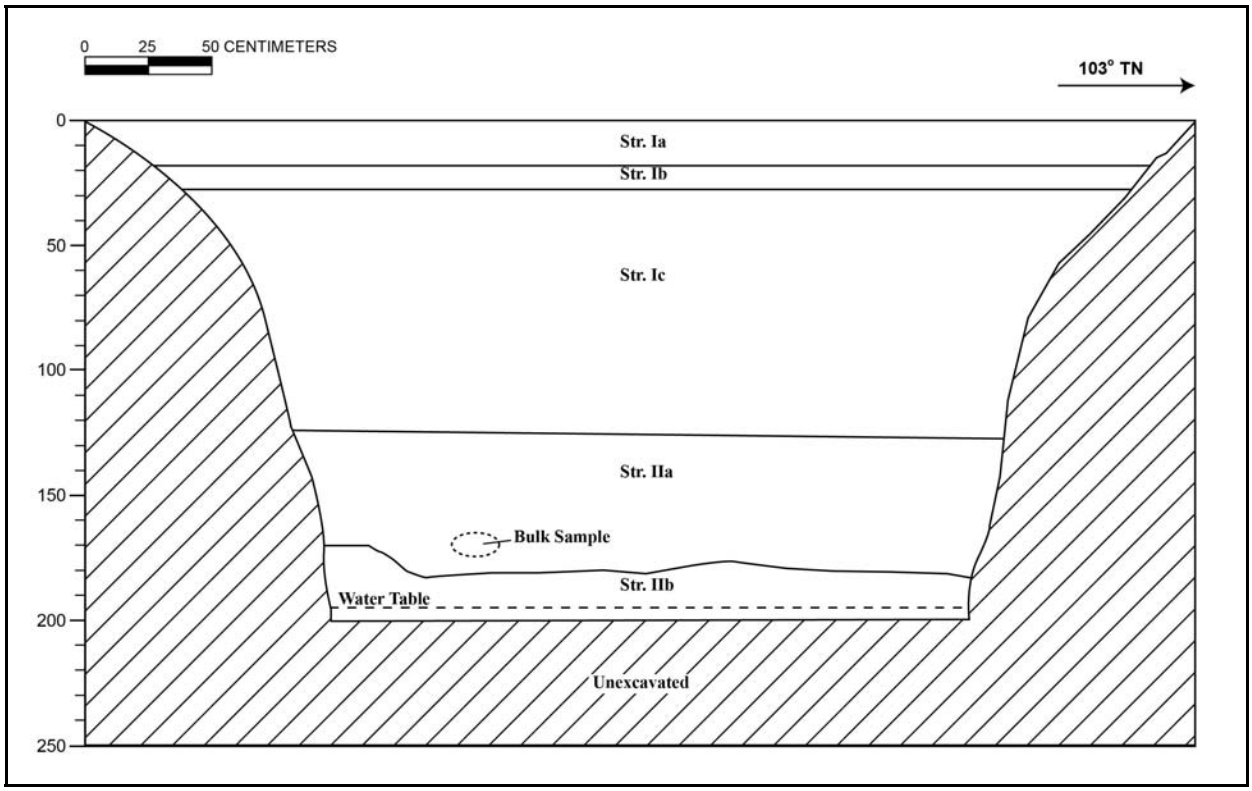
Summary of Background Research and Land Use: According to the 1890 Monsarrat and Lyons Moanalua and Kahauiki map, T-039 is located on the east end of a former sandy point that extended east into Moanalua Bay (Ke‘ehi Lagoon) (see Figure 96). No early historic development (e.g., roads, structures, etc.) is indicated at this locale. However, the region around the bay was a highly developed traditional cultural landscape with Kaioaloa Pond less than 880 m to the southwest and Ahua Fishpond beginning about 248 m to the north with Awaawaloa Fishpond and Māpunapuna Fishpond slightly further. The area also was supported by the confluence of Moanalua Stream, Kahauiki Stream, and Kalihi Stream along with many additional fishponds, extensive shallows, and the off-shore islet of Mokuoniki (see Figure 100). In the late 1800s, the OR&L railroad arced around the inland margins of Ke‘ehi Lagoon, but by 1919 a causeway carried the rail line straight across the bay about 91 m north of T-039 (see Figure 100). Between 1933 and 1943, extensive fill activities pushed the coastline nearly 500 m to the southeast (compare Figure 102 and Figure 106).

Documentation Limitations: T-039 was excavated to 2.0 mbs in natural sediment and beneath the water table at 1.95 mbs. There were no specific factors that limited the documentation of T-039.

Stratigraphic Summary: The stratigraphy of T-039 consisted of fill strata over natural sediment (Figure 226 and Figure 227). Observed strata were topsoil (Stratum Ia), silty clay loam (Stratum Ib),and crushed coral fill (Stratum Ic) overlying natural silty clay (Stratum IIa and IIb). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL).

Figure 225. Photograph of Airport Section 3, T-039, general location, view to north

Figure 226. Photograph of Airport Section 3, T-039, general view of profile, view to northwest



Stratum	Depth (cmbs)	Description
Ia	0-17	Topsoil; silty loam; 5YR 3/4 (dark reddish brown); weak, fine to medium, blocky structure; moist, friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; fine roots common
Ib	17-27	Fill, silty clay loam; 7.5YR 5/1 (gray); weak, fine, blocky structure; moist, friable consistency; slightly plastic; abrupt, smooth lower boundary; fine roots common; more gravelly toward the eastern portion of the trench
Ic	27-128	Fill; very gravelly sandy loam; 10YR 8/2 (very pale brown); structureless, single-grain; moist, loose consistency; mixed origin; abrupt, smooth lower boundary; crushed coral
IIa	128-180	Natural; silty clay; 10YR 4/1 (dark gray); structureless, massive; moist, firm consistency; plastic; mixed origin; abrupt, smooth lower boundary; contained decaying wood and marine shell
IIb	160-200	Natural; silty clay; Gley 10Y 6/1 (greenish gray); structureless, massive; wet, sticky consistency; plastic; marine origin

Figure 227. T-039 southeast profile and stratigraphic description

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed during the excavation of T-039. See lab results below for bulk sample contents.

Lab Results: A 2 liter bulk sediment sample was collected from Stratum IIa between 1.65 and 1.75 mbs and yielded trace amounts of non-midden shell (< 0.1 g), fragments of wood, and an unidentified fish vertebra (1.5 g). Laboratory analysis indicated that Stratum IIa and the underlying Stratum IIb represent natural deposits, based on comparative studies of natural sediments from nearby excavations. The natural strata reflect an intertidal rocky environment with very limited traditional Hawaiian habitation in the vicinity.

GPR Discussion: A review of amplitude slice maps revealed a linear feature which suggeseted the presence of utilities but none were encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-039 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.20-0.25 mbs and again around 0.90 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.10 mbs.

Summary: T-039 was excavated to 2.0 mbs in natural sediment and beneath the water table at 1.95 mbs. The stratigraphy of T-039 consisted of fill strata (Strata Ia-Ic) over natural sediment (Strata IIa-IIb). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL). The results of laboratory analysis indicated that the natural strata reflected an intertidal rocky environment with very limited traditional Hawaiian habitation in the vicinity. No cultural resources were identified within T-039.

7.2.40 Test Excavation 40 (T-040)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003 [Plat]
Street:	Nimitz Highway
Owner:	State DOT
Elevation:	0.8 m
UTM:	615009.0762 mE 2359421.907 mN
Max Length/Width/Depth:	3.50 m/1.10 m/0.45 m
Orientation:	290°/110° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 40 (T-040) was located in a grassy median between Nimitz Highway and Kamehameha Highway near the Middle Street interchange (see Figure 63; Figure 228). The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: As late as 1933, the vicinity of T-040 was in the shallow waters of Ke‘ehi Lagoon (see Figure 102). It was still a low-lying coastal wetland until the early 1940s (see Figure 106), but by the early 1950s it was filled in as part of a land reclamation project (see Figure 107).

Documentation Limitations: T-040 was excavated to a depth of 0.45 mbs and beneath a shallow water table at 0.38 mbs. There were no specific factors that limited documentation of T-040.

Stratigraphic Summary: The stratigraphy of T-040 consisted of grading fill (Stratum Ia and Ib) to the base of excavation (Figure 229 and Figure 230). These fill deposits correlate with available historic maps indicating the T-040 area was within shallow waters prior to being filled in between 1943 and 1953. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL) for this area.

Artifacts Discussion: No artifacts were observed.

Features Discussion: No features were observed.

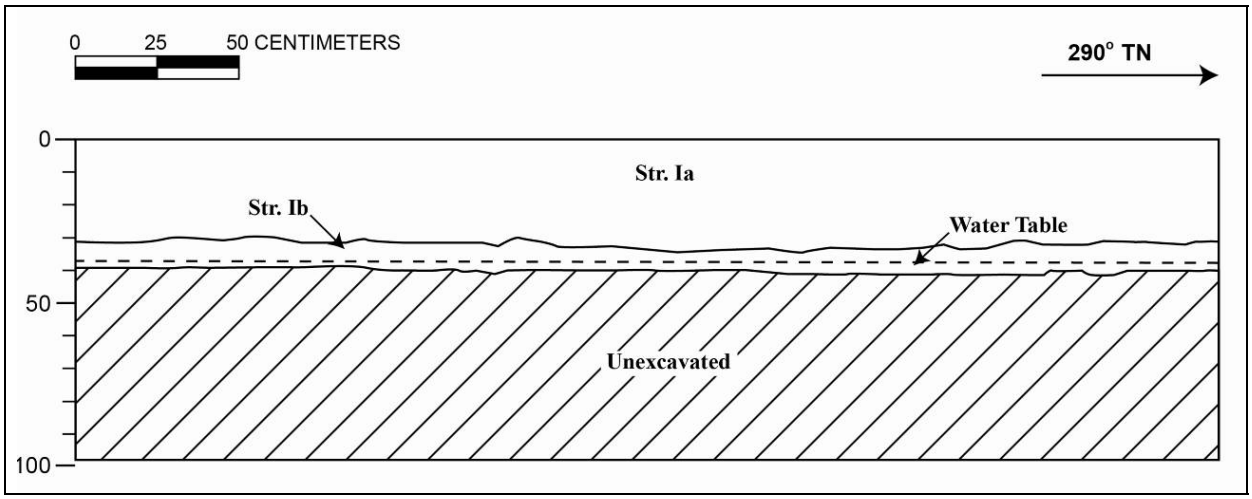
Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps reflected no linear features, which might indicate the presence of utilities (see Appendix E). Reflectivity was not uniform throughout the grid and increased around 0.75 mbs, but excavation ceased around 0.40 mbs due to the presence of the water table. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs and increased again around 0.75 mbs.

Figure 228. Photograph of Airport Section 3, T-040, general location, view to northwest

Figure 229. Photograph of Airport Section 3, T-040, general view of profile, view to west



Stratum	Depth (cmbs)	Description
Ia	0-35	Fill; very gravelly cobbly loam; 10YR 3/2 (very dark grayish brown); weak, fine to medium, crumb structure; dry, weakly coherent consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; observed asphalt fragments, coral cobbles, gravel cobbles (60%); grading fill
Ib	30-45	Fill; gravelly loam; 5YR 3/1 (very dark gray); moderate, fine, granular structure; wet, non-sticky consistency; non-plastic; mixed origin; observed asphalt fragments, coral and gravel cobbles; grading fill

Figure 230. T-040 northwest profile and stratigraphic description

GPR depth profiles for T-040 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.50 mbs.

Summary: T-040 was excavated to a depth of 0.45 mbs and beneath a shallow water table at 0.38 mbs. The stratigraphy of T-040 consisted of fill strata (Strata Ia-Ib) to the base of excavation and is consistent with infilling as part of a land reclamation project between 1943 and 1953. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No cultural resources were identified within T-040.

7.2.41 Test Excavation 41 (T-041)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street
Owner:	State DOT Airports Division
Elevation:	5.0 m
UTM:	611780.7602 mE, 2359500.894 mN
Max Length/Width/Depth:	3.0 m/0.90 m/2.3 m
Orientation:	350°/170° TN
Targeted Project Component:	Column Foundation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 41 (T-041) was located in the parking lot of the Honolulu International Airport *lei* shops, about 79 m east of Ala Auana Street (see Figure 52; Figure 231). The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: T-041 was located about 77 m west of the Honolulu International Airport Station footprint. This location was largely undeveloped until the creation of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation and the location of T-041 was in a former sugar cane field (Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the location of T-041, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map illustrates military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 101 and Figure 105).

Documentation Limitations: T-041 was excavated to basalt bedrock at a maximum depth of 2.30 mbs. There were no specific factors that limited documentation of T-041.

Stratigraphic Summary: The stratigraphy of T-041 consisted of fill strata over natural sediment and basalt bedrock (Figure 232 and Figure 233). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), extremely gravelly sand fill (Stratum Ic), gravelly sandy loam fill (Stratum Id), and very gravelly silty sand fill (Stratum Ie) overlying natural clay (Stratum II) and basalt bedrock (Stratum III). The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL) above Stratum II.

Artifact Discussion: A total of 9 artifacts were collected from Stratum Id and Stratum II (see Artifact Analysis, Section 8.1). A brown glass bottle lip-neck fragment and a wire nail were collected from the backdirt associated with Stratum Id. One nearly whole Coca-Cola bottle manufactured in 1942 was collected from Stratum II at about 1.40 mbs. A clear bottle neck fragment and five rusted metal fragments were collected from the bulk sediment samples from

Figure 231. Photograph of Airport Section 3, T-041, general location, view to east

Figure 232. Photograph of Airport Section 3, T-041 general view of profile, view to northwest

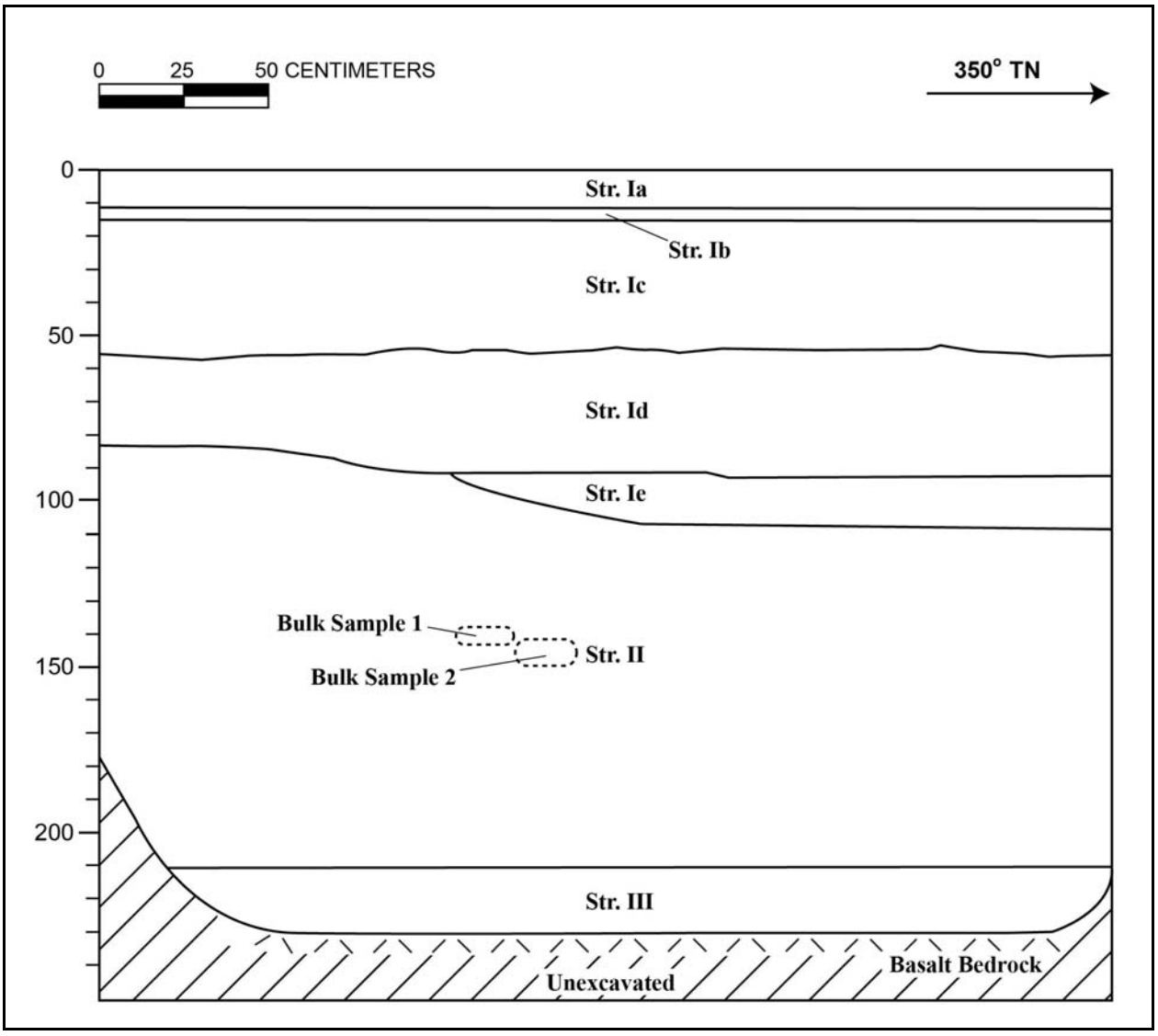


Figure 233. T-041 west profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-13	Asphalt
Ib	13-16	Fill; extremely gravelly silt; 7.5YR 4/2 (brown); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; clear, smooth lower boundary; contains subangular basalt gravel
Ic	16-58	Fill; extremely gravelly sand; 10YR 6/3 (pale brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; crushed coral
Id	58-94	Fill; gravelly sandy loam; 10YR 3/4 (dark yellowish brown); weak, fine crumb structure; moist, friable consistency; slightly plastic; mixed origin; abrupt, smooth lower boundary; contains glass bottle neck, nail; imported fill with subangular basalt
Ie	94-107	Fill; very gravelly silty sand; 10YR 5/2 (grayish brown); weak, fine crumb structure; moist, very friable consistency; abrupt, broken or discontinuous lower boundary
II	107-210	Clay; 10YR 4/3 (brown); blocky structure; moist, very friable consistency; plastic, terrigenous origin; contains Coca-Cola bottle, charcoal, slag, metal, glass bottle fragments and concrete; locally-procured fill
III	210-230	Natural; basalt; 10YR 6/5 (brownish yellow); massive structure; moist, strong consistency; non-plastic; lower boundary not visible; decomposing bedrock

Stratum II (see Lab Results below). Also observed but not collected from Stratum II were slag, plastic, and concrete. Artifacts collected from Stratum Id and II likely date from the early- to mid-twentieth century.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains were observed during the excavation of T-041. See lab results below for bulk sample contents.

Lab Results: Two bulk samples were collected from Stratum II. A 2 liter bulk sediment sample was collected from 1.38-1.43 mbs and yielded several water worn basalt gravels, one clear bottle neck fragment (0.1 g), and two small metal fragments (0.3 g). The second was a 10-liter sample collected at a depth of 1.40-1.50 mbs and screened through 1/8-inch wire mesh. The sample yielded three small corroded metal pieces (3.5 g), non-midden shell (1.5 g), and several small pieces of charcoal (0.5 g). The charcoal sample was not sent for wood taxa identification or radiocarbon analysis because it was not found in a discrete feature. The results of laboratory analysis and the presence of metal indicate post-Contact deposits.

GPR Discussion: A review of amplitude slice maps revealed no linear features, which might suggest the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-041 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.15 mbs and again around 0.60 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.30 mbs.

Summary: T-041 was excavated to basalt bedrock at depth of 2.30 mbs. The stratigraphy of T-041 consisted of fill strata (Strata Ia to Ie) overlying natural sediment (Stratum II) and basalt bedrock (Stratum III). The stratigraphy above Stratum II generally conformed to the USDA soil survey designation of Fill land (FL). The artifacts collected from Stratum Id and II date from early- to mid-twentieth century. The 1942 Coca-Cola bottle collected from Stratum II indicates the overlying fill layers post-date 1941. The excavation results of T-041 are significant because they (1) clearly date the reclamation fill deposits in this vicinity to after 1941, and (2) because they provide a complete stratigraphic profile to bedrock whereas excavation of nearby T-023, T-024, T-025, and T-026 ended at relatively shallow depths when trenching exposed buried concrete slabs (SIHP # -7421 Feature 1) related to circa 1942-1943 military build-up of this vicinity.

7.2.42 Test Excavation 42 (T-042)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	U.S. Postal Service
Elevation:	6.0 m
UTM:	611885.1849 mE, 2359484.58 mN
Max Length/Width/Depth:	3.60 m/0.90 m/1.91 m
Orientation:	196°/16° TN
Targeted Project Component:	Honolulu International Airport Station (Alternate A)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 42 (T-042) was located at the Alternate (southern) Station Footprint in the Honolulu International Airport economy parking lot at the corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 234). T-042 was located on property owned by the U.S. Postal Service. The excavation area was level with the surrounding land surface.

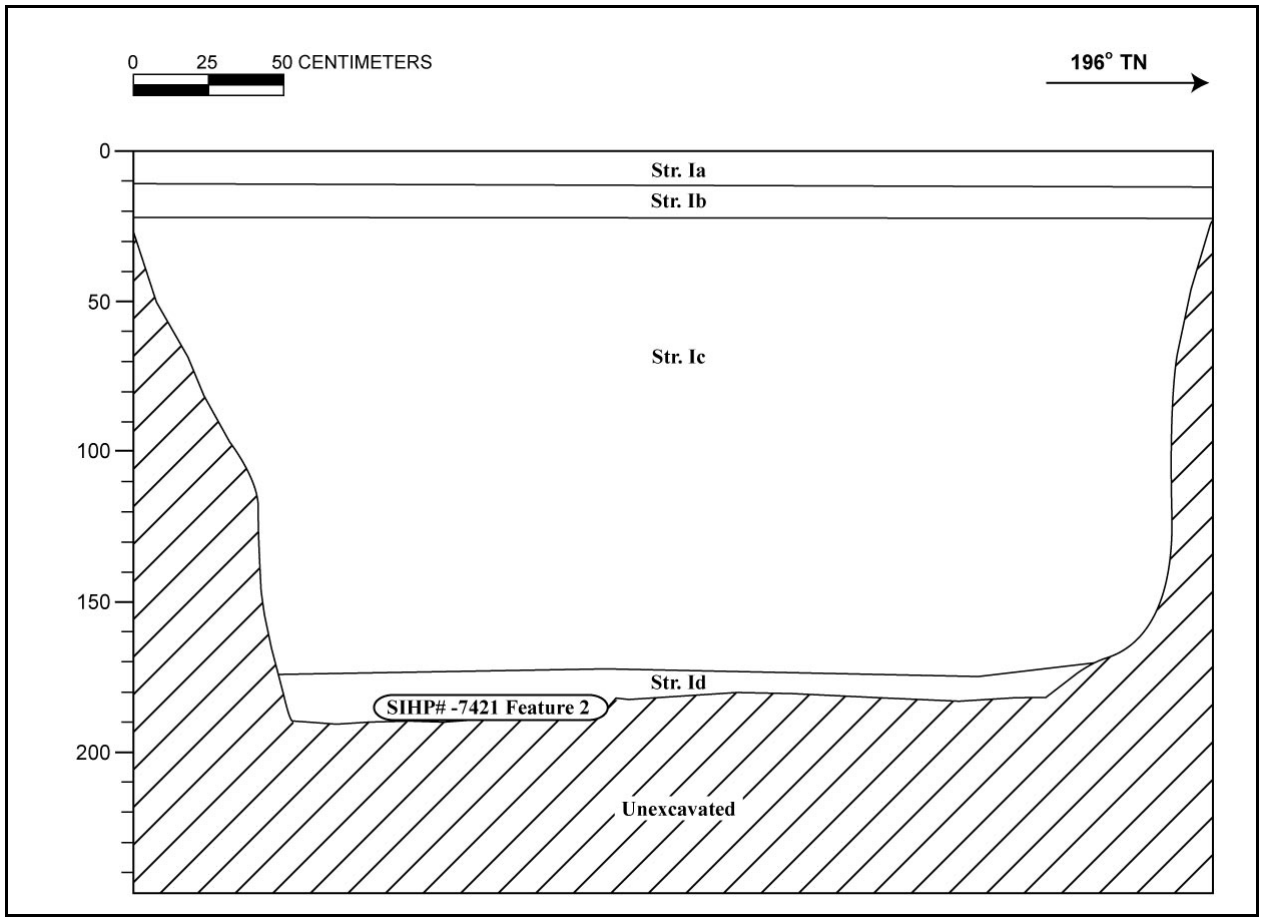
Summary of Background Research and Land Use: T-042 and nearby T-043, T-044, T-045, and T-046 were all located in the vicinity of the Honolulu International Airport Alternate Station Footprint (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-042 was located on the boundary of former sugar cane Field 10 ¼ of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the footprint of the Honolulu International Airport Alternate Station, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-042 was excavated to a depth of 1.91 mbs. The base of excavation of T-042 was limited by a thick concrete slab encountered at 1.83 mbs in the northern-central portion of the excavation area.

Stratigraphic Summary: The stratigraphy of T-042 consisted of fill strata over a concrete slab (Figure 235 to Figure 236). Observed strata were asphalt (Stratum Ia), associated basalt gravel base course (Stratum Ib), crushed coral fill (Stratum Ic), and very gravelly cobbly loamy sand fill (Stratum Id). A concrete slab, designated as SIHP # 50-80-13-7421 Feature 2, was encountered at the base of Stratum Id. The stratigraphy above Stratum Id conformed to the USDA soil survey designation of Fill land (FL).

Figure 234. Photograph of Airport Section 3, T-042, general location, view to north

Figure 235. Photograph of Airport Section 3, T-042, general view of profile, view to northeast



Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt
Ib	11-23	Fill; extremely gravelly sandy loam; 7.5YR 3/1 (very dark gray); weak, medium, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; basalt gravel base course
Ic	23-173	Fill; extremely gravelly cobbly sand; 10YR 8/2 (very pale brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; few fine roots; crushed coral
Id	173-191	Fill; very gravelly cobbly loamy sand; 10YR 3/4 (dark yellowish brown); moderate, fine blocky structure; moist, firm consistency; slightly plastic; mixed origin; lower boundary not visible; overlying a concrete slab (SIHP # -7421 Feature 2)

Figure 236. T-042 east profile and stratigraphic description

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 2, was documented within T-042. Feature 2 consists of a section of a concrete slab in the northern-central portion of the excavation area. The feature was observed in Stratum Id at 1.83 mbs. The concrete was 1.73 m wide and extended beyond the boundaries of excavation. Feature 2 was interpreted as a concrete remnant piece of mid-twentieth century infrastructure which possibly functioned as part of a receiving apron, dock, or warehouse foundation (See Section 7.4.3).

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features, which might have suggested the presence of utilities (see Appendix E for more details). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs and increased again around 0.75 mbs.

GPR depth profiles for T-042 identified horizontal banding, commonly associated with stratigraphic layering throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25-0.30 mbs and again around 0.60 mbs. No utilities were observed in the GPR profile. The maximum depth of clean signal return was about 1.50 mbs.

Summary: T-042 was excavated to a depth of 1.91 mbs. The stratigraphy of T-042 consisted of fill (Strata Ia- Id) overlying a concrete slab (designated as SIHP # 50-80-13-7421 Feature 2). The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Feature 2, the concrete slab, was interpreted as a remnant piece of a mid-twentieth century infrastructure which possibly functioned as part of a receiving apron, dock, or warehouse foundation (See Section 7.4.3).

7.2.43 Test Excavation 43 (T-043)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	State DOT Airports Division
Elevation:	6.0 m
UTM:	611885.5707 mE, 2359471.665 mN
Max Length/Width/Depth:	6.70 m/0.72 m/3.05 m
Orientation:	190°/10° TN
Targeted Project Component:	Honolulu International Airport Station (Alternate A)
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 43 (T-043) was located at the Alternate (southern) Station Footprint within the Honolulu International Airport economy parking lot on the east side of Ala Onaona Street (see Figure 53 and Figure 172; Figure 237). The excavation area was slightly elevated from the surrounding land surface with a slight downward slope to the north.

Summary of Background Research and Land Use: T-043 and nearby T-042, T-044, T-045, and T-046 were all located in the vicinity of the Honolulu International Airport Alternate Station Footprint (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-043 was located on the boundary of former sugar cane Field 10 ¼ of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the footprint of the Honolulu International Airport Alternate Station, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-043 was excavated to a depth of 3.05 mbs. Excavation was limited beyond 1.30 mbs in the northern end of T-043 due to a suspected utility line and safety precautions.

Stratigraphic Summary: The stratigraphy of T-043 (Figure 238 and Figure 239) consisted of fill strata to the base of excavation. Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), very gravelly silt loam fill (Stratum Ic), very gravelly cobbly sandy loam fill (Stratum Id), loam fill (Stratum Ie), very gravelly sandy clay fill (Stratum If), and very gravelly sandy clay (Stratum Ig) to the base of excavation. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL).

Figure 237. Photograph of Airport Section 3, T-043, general location, view to east

Figure 238. Photograph of Airport Section 3, T-043, general view of profile, view to southwest

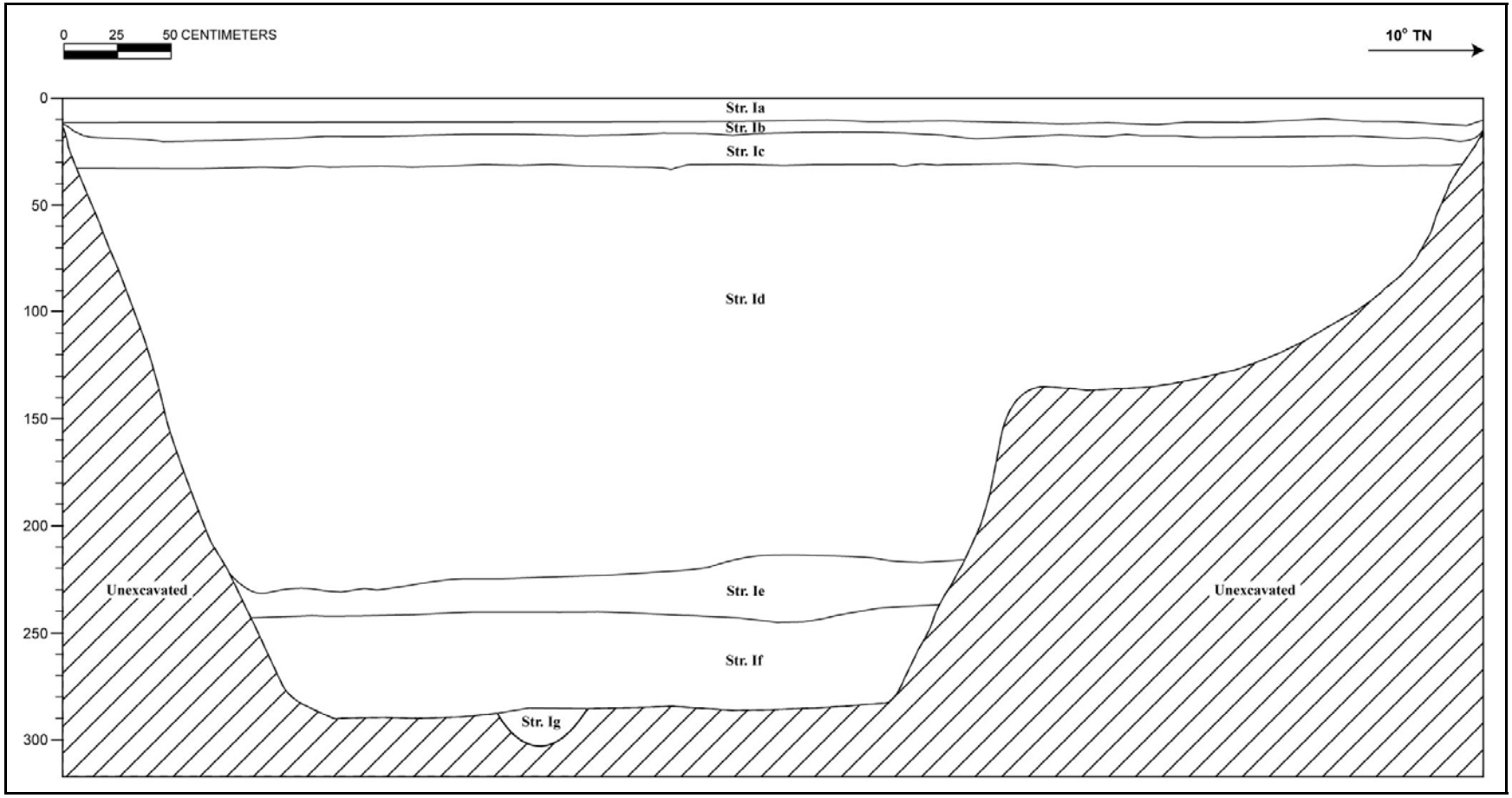


Figure 239. T-043 west profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt, parking lot surface
Ib	11-17	Fill; very gravelly sandy loam; 10YR 3/1 (very dark gray); structureless, single-grain; moist, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; few fine to medium roots; basalt gravel base course
Ic	17-32	Fill; very gravelly silty loam; 5YR 3/3 (dark reddish brown); weak, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; abrupt, smooth lower boundary; few medium roots
Id	32-231	Fill; very gravelly cobbly sandy loam; 10YR 7/4 (very pale brown); structureless, single-grain; moist, friable consistency; non-plastic; marine origin; clear, smooth lower boundary; few medium roots; crushed coral
Ie	215-245	Fill; loam; 10YR 4/4 (dark yellowish brown); weak, fine crumb structure; moist, friable consistency; slightly plastic; mixed origin; clear, smooth lower boundary
If	238-290	Fill; very gravelly cobbly sandy loam; 10YR 8/3 (very pale brown); structureless, single-grain; moist, friable consistency; non-plastic; clear lower boundary; crushed coral
Ig	285-305	Fill; very gravelly sandy clay; 10YR 4/2 (dark grayish brown); structureless, single-grain; moist, friable consistency; slightly plastic; mixed origin

Artifact Discussion: No artifacts were observed during the excavation of T-043. See lab results below for bulk sample contents.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No osseous faunal remains or shell material were observed during the excavation of T-043. See lab results below for results of bulk sample contents.

Lab Results: A 1 liter bulk sediment sample was collected from Stratum Ig between 2.85 mbs and 3.05 mbs. The sample yielded one clear glass bottle fragment (0.3 g) and marine shell gastropods consisting of *Cerithium sp*., *Turbo sandwicensis*, and *Trochus intextus* (11.0 g). The clear glass fragment lacks any datable attributes; however, it is suggested to relate to the mid-twentieth century based on provenience and relative dating of similar finds (see Section 8.1). The shell remains are considered typical midden species, but were likely naturally-deposited due to the small size and fragmentary nature of the remains (see Section 8.2).

GPR Discussion: A review of amplitude slice maps reflected no linear features, which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs.

GPR depth profiles for T-043 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.20-0.25 mbs. No utilities were observed in the profile. The maximum depth of clean signal return was about 0.90 mbs.

Summary: T-043 was excavated to a depth of 3.05 mbs. The stratigraphy of T-043 consisted of fill (Strata Ia-Ig) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land (FL). Gastropod shell material and a clear glass bottle fragment were identified during bulk sediment sample analysis. The shell material was likely naturally-deposited and the bottle fragment is suggested to relate to the mid-twentienth century. No cultural resources were identified within T-043.

7.2.44 Test Excavation 44 (T-044)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	State DOT Airports Division
Elevation:	6.1 m
UTM:	611897.755 mE, 2359482.225 mN
Max Length/Width/Depth:	6.95 m/0.76 m/2.5 m
Orientation:	278°/98° TN
Targeted Project Component:	Honolulu International Airport Alternate Station
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 44 (T-044) was located at the Alternate (southern) Station Footprint within the Honolulu International Airport economy parking lot. T-044 is about 40 m south of Ala Onaona Street and 30 m east of Ala Auana Street (see Figure 53 and Figure 172; Figure 240). The excavation area was level with surrounding land surface.

Summary of Background Research and Land Use: T-044 and nearby T-042, T-043, T-045, and T-046 were all located in the vicinity of the Honolulu International Airport Alternate Station Footprint (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-044 was located on the boundary of former sugar cane Field 10 ¼ of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the footprint of the Honolulu International Airport Alternate Station, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-044 was excavated to coral bedrock at a maximum depth of 2.5 mbs. There were no specific factors that limited documentation of T-044.

Stratigraphic Summary: The stratigraphy of T-044 consisted fill strata over the decomposing coral shelf. (Figure 241 and Figure 242) Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), and crushed coral fill (Strata Ic and Id) overlying decomposing coral bedrock (Stratum II) and hard coral bedrock. The stratigraphy observed above the decomposing coral bedrock conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 240. Photograph of Airport Section 3, T-044, general location, view to west

Figure 241. Photograph of Airport Section 3, T-044, general view of profile, view to southwest

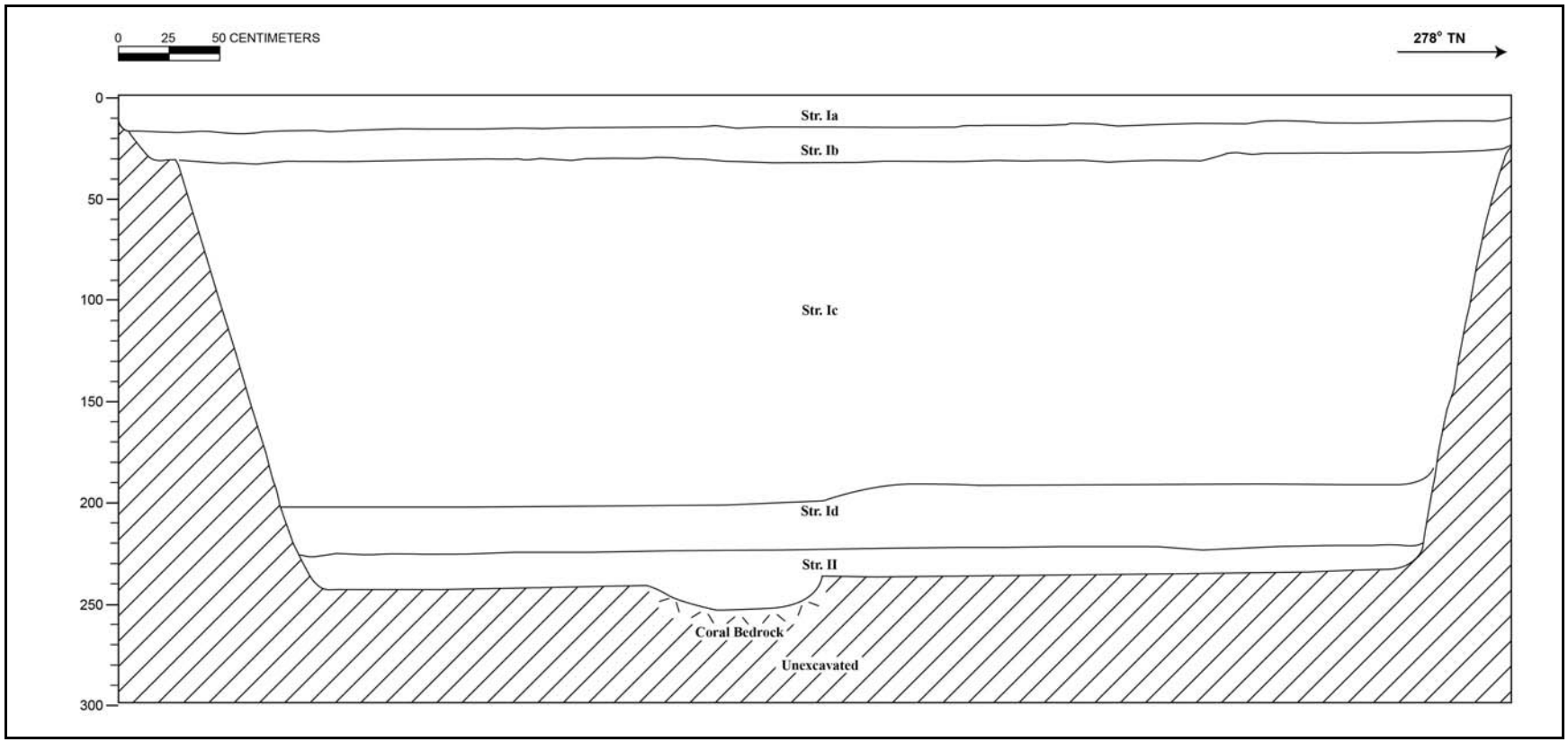


Figure 242. T-044 south profile (above) and stratigraphic description (below)

Stratum	Depth (cmbs)	Description
Ia	0-12	Asphalt, parking lot surface
Ib	12-30	Fill; very gravelly silty loam; 10YR 3/2 (very dark grayish brown); weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; basalt gravel base course
Ic	27-200	Fill; silty sand; 2.5Y 6/4 (light yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; clear, smooth lower boundary; contained three marine shells, probably natural in origin; crushed coral
Id	190-221	Fill; silty sand; 2.5Y 8/2 (pale yellow); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral
II	221-250	Natural; decomposing coral bedrock; 10YR 4/4 (dark yellowish brown); structureless, massive; moist; non-plastic; marine origin; overlies solid bedrock

Faunal Remains Discussion: No osseous faunal remains were observed. Three relatively large and uncommon marine shells were collected from Stratum Ic between 0.61 mbs and 1.38 mbs. These remains consisted of the gastropod *Prodotia ignia* (11.3 g) and the bivalves *Chama fibula* (82.9 g) and *Arcidae barbatia* (11.1 g). Based on the fill context of Stratum Ic, these remains are not archaeologically significant.

Lab Results: No additional laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed linear features which indicate the presence of utilities within the grid but not within the trench location. Reflectivity was relatively uniform throughout the grid and decreased with depth except for the utilities. A transition from higher reflectivity to lower reflectivity was observed at about 0.50 mbs with the exception of the utilities.

GPR depth profiles for T-044 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.75-1.00 mbs, but no changes in stratigraphy were observed during excavation. Utilities were observed in the GPR profile, but not within the excavation boundaries. The maximum depth of clean a signal return was about 1.15 mbs (see Appendix E for more details).

Summary: T-044 was excavated to coral bedrock at a depth of 2.5 mbs. The stratigraphy of T-044 consisted of fill (Strata Ia-Id) and decomposing coral bedrock (Stratum II) above solid coral bedrock. The stratigraphy observed above the coral bedrock conformed to the USDA soil survey designation of Fill land (FL). No cultural resources were identified.

7.2.45 Test Excavation 45 (T-045)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	State DOT Airports Division
Elevation:	6.18 m
UTM:	611901.5382 mE, 2359472.014 mN
Max Length/Width/Depth:	3.0 m/0.9 m/0.6 m
Orientation:	104°/284° TN
Targeted Project Component:	Honolulu International Airport Alternate Station
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 45 (T-045) was located at the Alternate (southern) Station Footprint in the Honolulu International Airport economy parking lot on the east (Diamond Head) corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 243). The excavation area was level with the surrounding surface.

Summary of Background Research and Land Use: T-045 and nearby T-042, T-043, T-044, and T-046 were all located in the vicinity of the Honolulu International Airport Alternate Station Footprint (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-045 was located on the boundary of former sugar cane Field 10 ¼ of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the footprint of the Honolulu International Airport Alternate Station, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-045 was excavated to a depth of 0.60 mbs. Multiple utility lines were encountered within the excavation area in Stratum Ic (crushed coral fill) which limited further excavation.

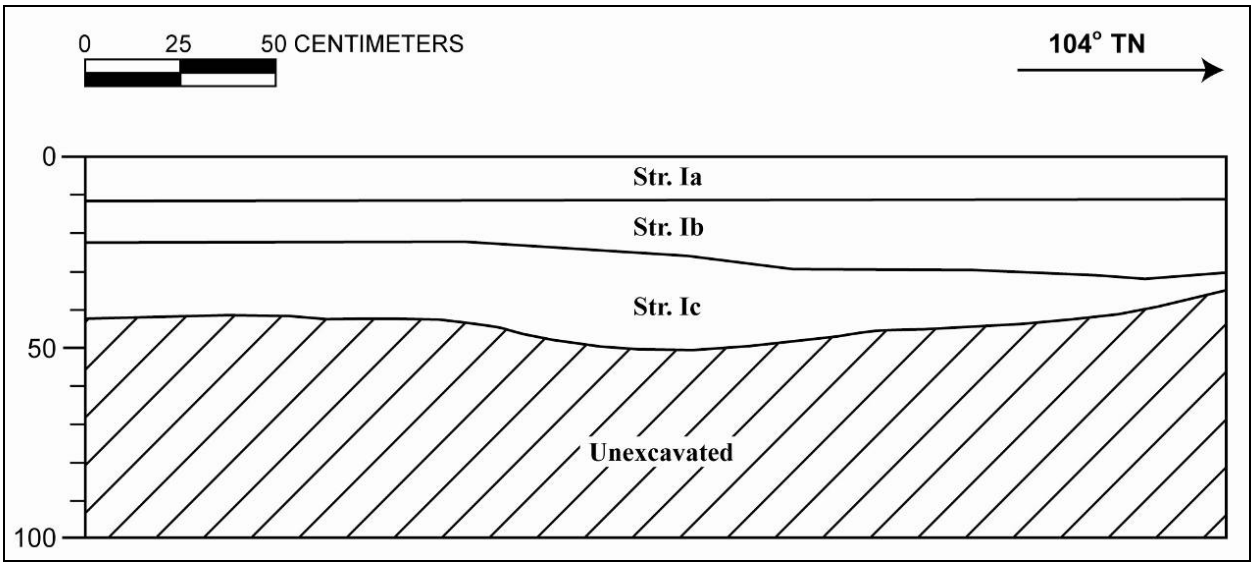
Stratigraphic Summary: The stratigraphy of T-045 consisted of fill strata to the base of excavation (Figure 244 and Figure 245). Observed strata were asphalt (Stratum Ia), basalt base course (Stratum Ib), and crushed coral fill (Stratum Ic). The observed stratigraphy in T-045 conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Figure 243. Photograph of Airport Section 3, T-045, general location, view to east

Figure 244. Photograph of Airport Section 3, T-045, general view of profile, view to northwest



Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt
Ib	12-34	Fill; very gravelly silty loam; 10YR 3/2 (very dark grayish brown); weak, fine crumb structure; moist, friable consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; basalt gravel base course
Ic	23-50	Fill; very gravelly cobbly sand; 10YR 5/4 (yellowish brown); structureless, single-grain; moist, loose consistency; non-plastic; marine origin; crushed coral

Figure 245. T-045 northeast profile and stratigraphic description

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps revealed no linear features which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-045 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. An anomaly was observed in the GPR profile around 0.45 mbs, which could correspond to the fiber optic utilities found around that same depth. The maximum depth of clean signal return was about 1.0 mbs.

Summary: T-045 was excavated to a depth of 0.60 mbs. The stratigraphy of T-045 consisted of fill (Strata Ia-Ic) to the base of excavation. The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL). No cultural resources were identified within T-045.

7.2.46 Test Excavation 46 (T-046)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	State DOT Airports Division
Elevation:	5.5 m
UTM:	611924.9349 mE, 2359468.576 mN
Max Length/Width/Depth:	3.72 m/0.92 m/2.45 m
Orientation:	282°/102° TN
Targeted Project Component:	Honolulu International Airport Alternate Station
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 46 (T-046) was located at the Alternate (southern) Station Footprint in the Honolulu International Airport economy parking lot on the east (Diamond Head) corner of Ala Onaona Street and Ala Auana Street (see Figure 53 and Figure 172; Figure 246). The excavation area was slightly elevated above the surrounding land surface.

Summary of Background Research and Land Use: T-046 and nearby T-042, T-043, T-044, and T-045 were all located in the vicinity of the Honolulu International Airport Alternate Station Footprint (see Figure 172). This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (see Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation. T-046 was located on the boundary of former sugar cane Field 10 ¼ of the Honolulu Plantation circa 1935 (see Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the footprint of the Honolulu International Airport Alternate Station, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map shows military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-046 was excavated to a maximum depth of 2.45 mbs. A utility line limited excavation below 0.65 mbs in the west end of the excavation. A concrete slab was encountered at 2.05 mbs which further limited the excavation area. A jackhammer was used to break through a portion of the concrete slab to investigate the underlying stratigraphy.

Stratigraphic Summary: The stratigraphy of T-046 consisted of fill strata to the base of excavation (Figure 247 and Figure 248). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), possible landscaping fill (Stratum Ic), gravelly silty clay loam fill (Stratum Id), crushed coral fill (Stratum Ie and If), and gravelly sandy clay fill (Stratum Ig), overlying a buried concrete slab (Stratum IIa/SIHP # 50-80-13-7421 Feature 2), buried asphalt pavement (Stratum IIb/SIHP # -7421 Feature 2), associated base course (Stratum IIc/SIHP #

Figure 246. Photograph of Airport Section 3, T-046, general location, view to southwest

Figure 247. Photograph of Airport Section 3, T-046, general view of profile, view to southeast

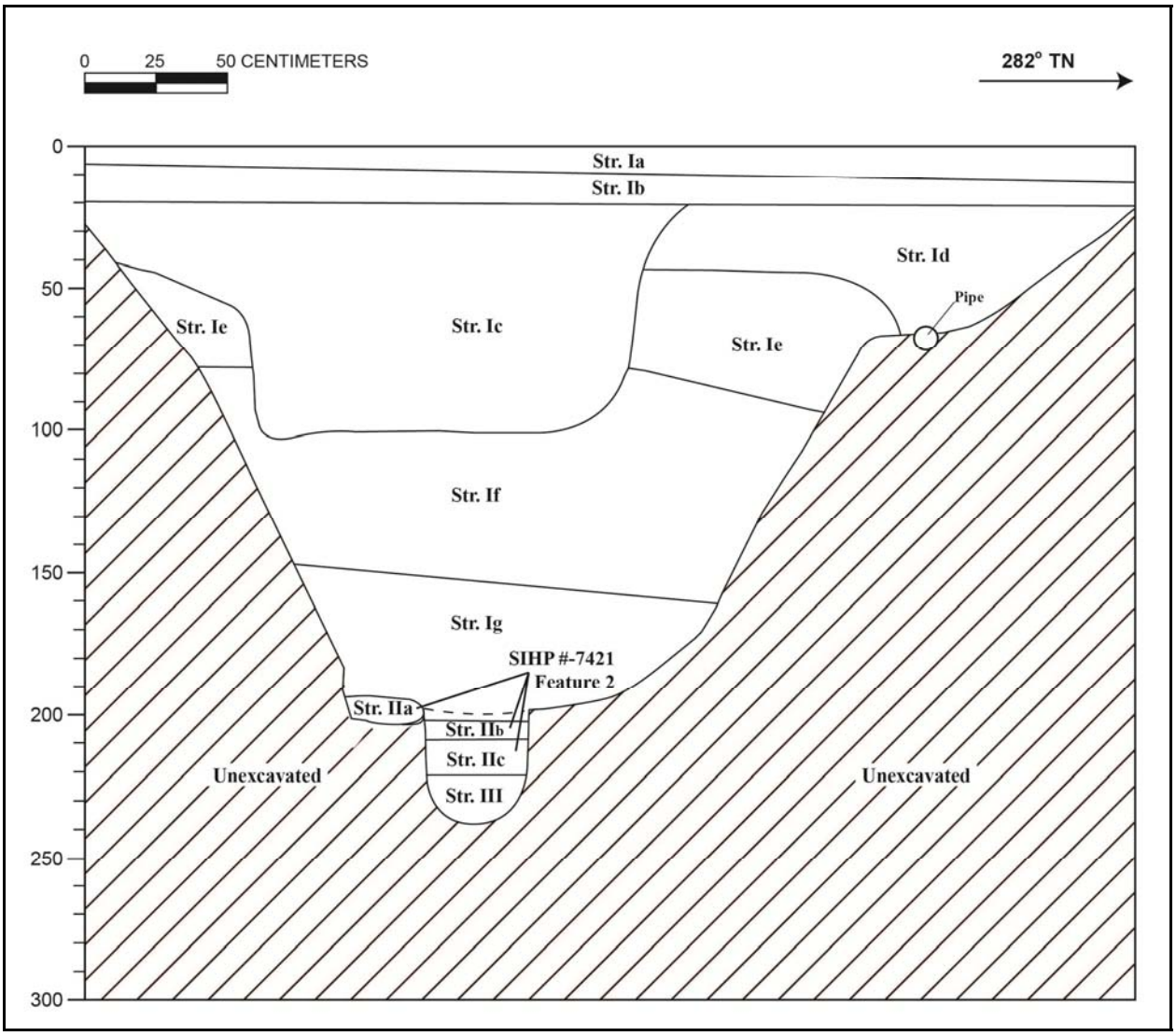


Figure 248. T-046 south profile (above) and stratigraphic description (below)

T-046 stratigraphic description

Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt
Ib	7-21	Fill; very gravelly sandy loam; 10YR 3/1 (very dark gray); weak, fine crumb structure; moist, very friable consistency; non-plastic; terrigenous origin; very abrupt, smooth lower boundary; few fine roots; basalt gravel base course
Ic	21-91	Fill; silty clay loam; 7.5YR 3/3 (dark brown); weak, fine granular structure; moist, friable consistency; plastic; terrigenous origin; abrupt, discontinuous lower boundary; many medium roots; possible landscaping fill
Id	21-68	Fill; gravelly silty clay loam; 10YR 3/4 (dark yellowish brown); weak, fine crumb structure; moist, friable consistency; plastic; terrigenous origin; clear, broken/discontinuous lower boundary; many fine roots; contains basalt and coral gravel
Ie	45-98	Fill; sand; 2.5YR 8/4 (pale yellow); structureless, single-grain (very fine); moist, loose consistency; non-plastic; marine origin; clear, broken/discontinuous lower boundary; crushed coral
If	81-165	Fill; sand; 10YR 7/3 (very pale brown); single-grain (very fine), structureless; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral
Ig	152-205	Fill; gravelly sandy clay; 7.5YR 3/3 (dark brown); moderate, fine crumb structure; moist, friable consistency; plastic; mixed origin; few coarse roots
IIa	200-208	Concrete slab; a component of SIHP # -7421 Feature 2
IIb	208-215	Asphalt; a component of SIHP # -7421 Feature 2
IIc	215-226	Fill; coral and basalt gravel base course; a component of SIHP # -7421 Feature 2
III	226-245	Fill; very gravelly sandy loam; 10 YR 4/1 (dark gray); weak, very fine crumb structure, dry, loose consistency; non-plastic; mixed origin

-7421 Feature 2), and very gravelly sandy loam fill (Stratum III). The observed stratigraphy above the concrete slab conformed to the USDA soil survey designation of Fill land (FL).

Artifact Discussion: No artifacts were observed.

Feature Discussion: One feature, designated as SIHP # 50-80-13-7421 Feature 2, was documented within T-046. Feature 2 consists of a 0.8 m thick concrete slab (Stratum IIa), 0.6 m of asphalt (Stratum IIb), and 0.11 m of coral and basalt gravel base course (Stratum IIc). The feature was observed at 2.0 mbs and extended beyond the boundaries of T-046. Feature 2 was interpreted as relating to mid-twentieth century infrastructure development, possibly part of a receiving apron, dock, or warehouse foundation.

Faunal Remains Discussion: No faunal remains were observed.

Lab Results: No laboratory analysis was conducted.

GPR Discussion: A review of amplitude slice maps did not reveal any linear features, although a utility was encountered during excavation (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.25 mbs.

GPR depth profiles for T-046 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.25 mbs. No utilities were observed in the GPR profile although a utility was encountered during excavation. The maximum depth of clean signal return was about 0.85 mbs.

Summary: T-046 was excavated to a depth of 2.45 mbs. The stratigraphy of T-046 consisted of fill (Strata Ia-Ig) overlying a former road surface (Strata IIa-IIc), designated as SIHP # 50-80-13-7421 Feature 2, and additional fill (Stratum III). The observed stratigraphy conformed to the USDA soil survey designation of Fill land (FL). The former road surface consisted of a concrete slab (IIa), asphalt (IIb), and coral and basalt gravel base course (IIc). Feature 2, the concrete slab, was interpreted as a remnant mid-twentieth century infrastructure which possibly functioned as part of a receiving apron, dock, or warehouse foundation (See Section 7.4.3).

7.2.47 Test Excavation 47 (T-047)

***Ahupua‘a*:**	Moanalua
LCA:	Ali‘i Award 7715 (to Kapuāiwa, Lot Kamehameha)
TMK #:	1-1-003:001
Street:	Ala Onaona Street (*makai* or south of the street)
Owner:	State DOT Airports Division
Elevation:	5.2 m
UTM:	612077.4764 mE, 2359471.858 mN
Max Length/Width/Depth:	3.8 m/0.96 m/1.84 m
Orientation:	191°/11°TN
Targeted Project Component:	Honolulu International Airport Station
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 47 (T-047) was located in the Honolulu International Airport economy parking lot just east of the exit lanes, at Ala Onaona Street (see Figure 53; Figure 249). The excavation area was relatively level with the surrounding land surface.

Summary of Background Research and Land Use: T-047 was located about 130 m east of the Honolulu International Airport Station footprint. This location was largely undeveloped pasture land prior to the establishment of the OR&L railway in the late 1800s (Figure 97). By the 1900s, the railway and irrigation improvements had furthered development of the Honolulu Plantation, and T-047 was located within the former sugar cane fields (Figure 104). According to the 1933 U.S. Army War Department Fire Control map (Ewa quadrangle), the Honolulu Plantation railway and pipe line traversed directly through the location of T-047, and development was sparse in the region (see Figure 101). The 1943 U.S. Army War Department map indicates military-related residential and infrastructural development in the immediate area which continued past the mid-1940s (see Figure 105).

Documentation Limitations: T-047 was excavated to the coral shelf at 1.84 mbs. There were no specific factors that limited documentation.

Stratigraphic Summary: The stratigraphy of T-047 consisted of fill strata overlying natural sediment (Figure 250 and Figure 251). Observed strata were asphalt (Stratum Ia), associated base course (Stratum Ib), very gravelly sandy loam fill (Stratum Ic), and very gravelly loam fill (Stratum Id) overlying natural silty clay loam (Stratum II) above the coral shelf. The observed stratigraphy above Stratum II generally conformed to the USDA soil survey designation of Fill land (FL).

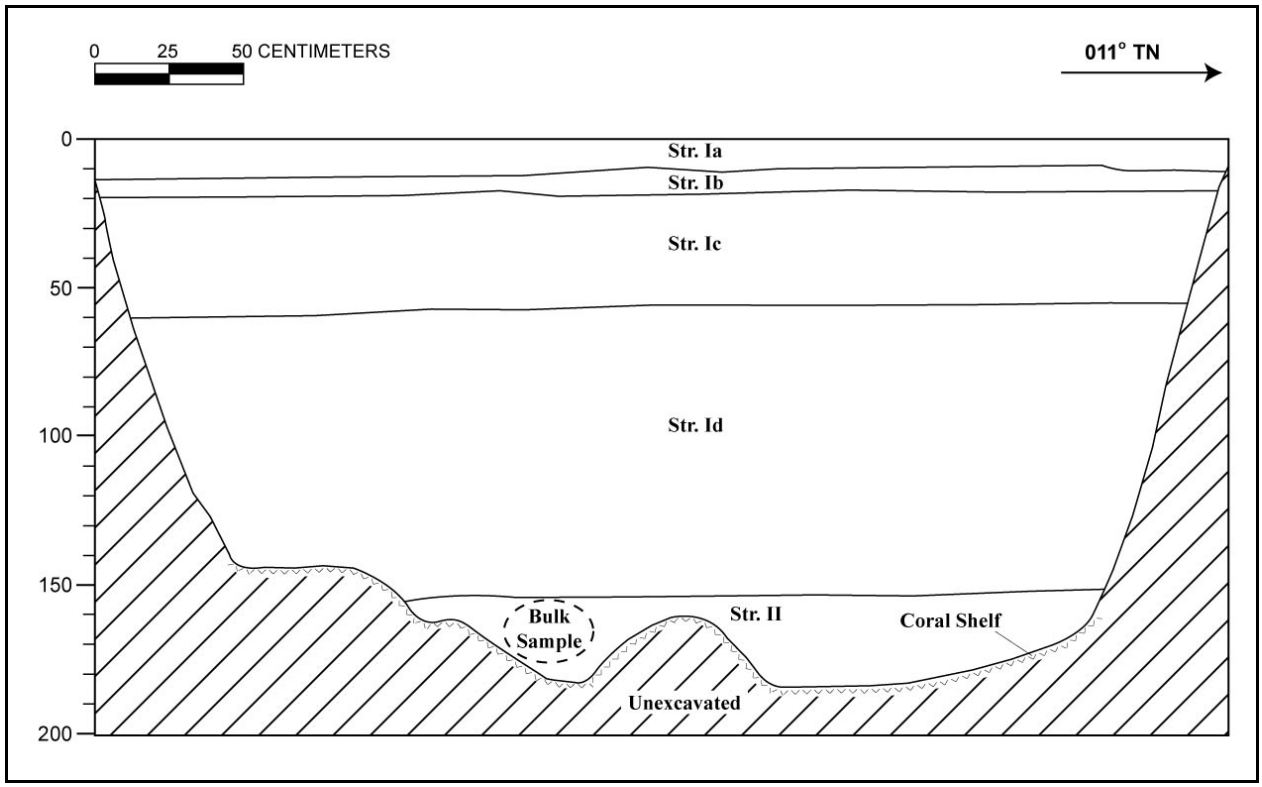
Artifact Discussion: Several small glass fragments were observed in Stratum II (silty clay loam). However, the material was not collected due to the absence of datable attributes.

Feature Discussion: No features were observed.

Faunal Remains Discussion: No faunal remains were observed.

Figure 249. Photograph of Airport Section 3, T-047, general location, view to northeast

Figure 250. Photograph of Airport Section 3, T-047, general view of profile, view to southeast



Stratum	Depth (cmbs)	Description
Ia	0-11	Asphalt
Ib	11-19	Fill; extremely gravelly loamy sand; 10YR 5/1 (gray); structureless, single-grain; dry, loose consistency; non-plastic; terrigenous origin; abrupt, smooth lower boundary; base course
Ic	19-54	Fill; extremely gravelly sand; 10YR 7/4 (very pale brown); weak, fine, blocky structure; moist, very friable consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed cora
Id	54-155	Fill; very gravelly loam; 10YR 4/4 (dark yellowish brown); structureless, single-grain; moist, friable to firm consistency; mixed origin; clear, smooth lower boundary; few fine to medium roots; contained gravel and coral
II	155-184	Natural; silty clay loam; 5YR 4/4 (reddish brown); weak, fine crumb structure; moist, friable consistency; slightly plastic; terrigenous origin; many fine roots; contained glass fragments (not collected); over coral shelf

Figure 251. T-047 west profile and stratigraphic description

Lab Results: A 6-liter bulk sediment sample was collected from Stratum II, between 1.55 mbs and 1.70 mbs. The sample yielded a small amount of numerous bark-like filaments. No significant cultural material was observed.

GPR Discussion: A review of amplitude slice maps revealed no linear features, which might have suggested the presence of utilities (see Appendix E). Reflectivity was relatively uniform throughout the grid and decreased with depth. A transition from higher reflectivity to lower reflectivity was observed at about 0.75 mbs.

GPR depth profiles for T-047 identified horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The GPR profile also indicated a change in reflectivity occurring around 0.15 mbs and again around 0.60 mbs. An anomaly was observed in the GPR profile but was not observed during excavation. The maximum depth of clean signal return was about 1.15 mbs.

Summary: T-047 was excavated to the coral shelf at 1.84 mbs. The stratigraphy of T-047 consisted of fill (Strata Ia-Id) overlying natural sediment (Stratum II) above the coral shelf. The stratigraphy generally conformed to the USDA soil survey designation of Fill land (FL) above the natural sediment (Stratum II) encountered at 1.55 mbs. No cultural resources were identified within T-047.

7.3 Summary of Stratigraphy

The northwestern portion of the Airport Section 3 study area is developed on tuff sediments derived from the tuff cones of the Salt Lake area. While these sediments relate primarily to the Āliamanu, Āliapa‘akai, and Makalapa eruptions of the Honolulu Volcanic Series there were a number of related but somewhat independent volcanic cones and vents (Figure 252) that further complicate the geologic picture.

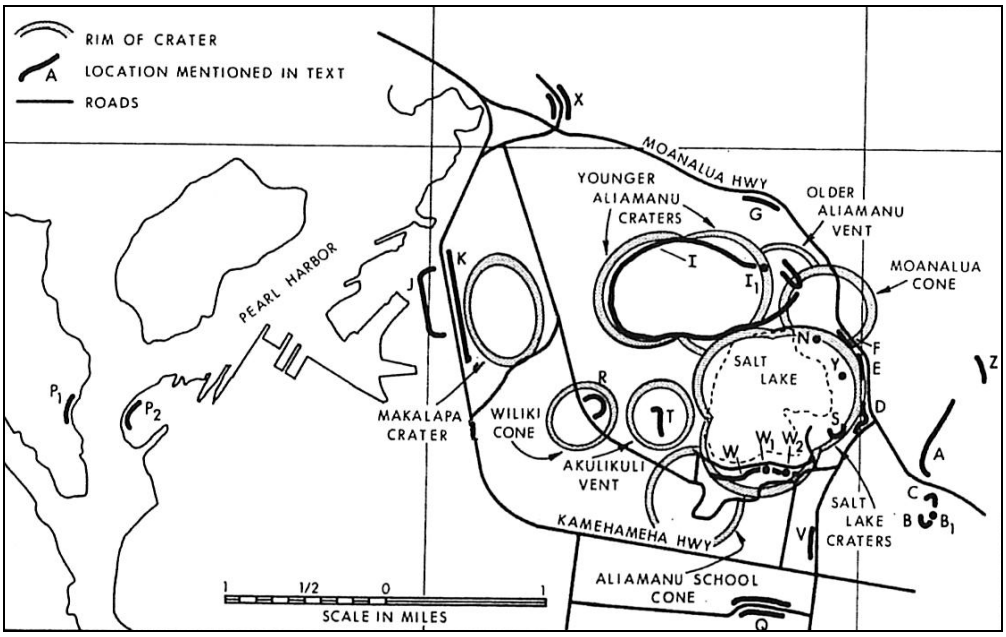


Figure 252. Honolulu Volcanic Series events of the Salt Lake area (from Pankiwsky 1972:243)

The Āliamanu volcanic event is the oldest and is associated with the Kaena (+29 m) Stand of the sea. The Salt Lake and Makalapa eruptions are understood as roughly contemporaneous during the Waipio (-12 m) Stand of the sea (Macdonald et al. 1983:440-441). Geologists have found dating these stands of the sea in an absolute sense to be exceedingly problematic. Some sources estimate a date of circa 600,000 years old +/- 100,000 years for the Kaena Stand (U.S. Department of the Interior 1979:180). Pankiwsky (1972:242) posits that later eruptions in the Salt Lake area were as recent as 100,000 years ago. Beds of gravel, sand and mudflow debris are “interfingered” with air-deposited tuff (Macdonald et al. 1983:445) which has often been re-worked and/or interbedded with coral limestone or marine sediments by the 40+ m eustatic change in sea level. Typically the naturally deposited sediments derived from this tuff are clays or silt clays often with gravel sized fragments of tuff.

The thickness of the fill deposits throughout Airport Section 3 study area extended over 3.0 mbs in some excavations (see Table 9). Much of this fill material was typically derived from the immediate vicinity and was often clays or silty clays derived from tuff. The discrimination of fill versus tuff was sometimes quite clear owing to the inclusion of historic debris and/or mottling or marbling, of mixing with other sediments, and the presence of clear lower boundaries. In several cases the fill determinations were validated by the discovery of underlying asphalt or concrete. In other cases the distinction was subtle or unclear.

Table 9. Summary of Stratigraphy and Finds from Airport Section 3 Test Excavations

Test Excav. No.	Max Depth of Fill (cmbs)	BOE (cmbs)	Stratigraphy	Contents
T-001	295+	295	Fill to BOE	No significant finds
T-002	275	275	Fill overlying bedrock	No significant finds
T-003	145	218	Fill over natural clay loam overlying decomposing coral shelf	No significant finds
T-004	180	185	Fill overlying bedrock	No significant finds
T-005	60	125	Fill over natural extremely gravelly sandy clay loam overlying bedrock	No significant finds
T-006	100	220	Fill over natural silt loamy cobbly stony clay	No significant finds
T-007	243	243	Fill overlying bedrock	Poured concrete block in trench wall
T-008	17	40	Fill overlying decomposing bedrock	No significant finds
T-009	31	50	Fill overlying decomposing volcanic tuff	No significant finds
T-010	20	59	Fill overlying decomposing bedrock	No significant finds
T-011	15	50	Fill overlying decomposing bedrock	No significant finds
T-012	39	78	Fill overlying bedrock	No significant finds
T-013	195	195	Fill overlying bedrock	No significant finds
T-014	290+	290	Fill to BOE	No significant finds
T-015	290+	290	Fill to BOE	SIHP # -7420, Feature 1, asphalt pavement
T-016	178+	178	Fill to BOE	No significant finds
T-017	155	285	Fill over naturally deposited clay loam overlying volcanic tuff	SIHP # -7420, Feature 2, asphalt pavement
T-018	200	305	Fill over natural deposited clay overlying volcanic tuff	SIHP # -7420, Feature 3, asphalt pavement, concrete slab/curbing, coral base course
T-019	99	290	Fill overlying natural clay	No significant finds
T-020	100	190	Fill overlying natural clay	No significant finds
T-021	110	280	Fill over silty sand overlying coral shelf	SIHP # -7421, Feature 3, coral pavement, coral base course
T-022	140	304	Fill over natural silty clay loam.	No significant finds

Test Excav. No.	Max Depth of Fill (cmbs)	BOE (cmbs)	Stratigraphy	Contents
T-023	120	120	Fill over a concrete slab	SIHP # -7421, Feature 1, concrete slab
T-024	108	108	Fill over a concrete slab	SIHP # -7421, Feature 1, concrete slab
T-025	90	90	Fill over a concrete slab	SIHP # -7421, Feature 1, concrete slab
T-026	82	82	Fill over a concrete slab	SIHP # -7421, Feature 1, concrete slab
T-027	179	282	Fill over natural silty clay loam overlying coral shelf	No significant finds
T-028	130	205	Fill overlying volcanic tuff	No significant finds
T-029	98	138	Fill overl silty clay loam overlying coral shelf	No significant finds
T-030	290	290	Fill to BOE	No significant finds
T-031	30	53	Fill over natural loam overlying coral shelf	No significant finds
T-032	105	133	Fill over natural clay loam overlying coral shelf	No significant finds
T-033	128	150	Fill overl natural clay loam overlying coral shelf	No significant finds
T-034	52	151	Fill overl natural clay loam overlying coral shelf	No significant finds
T-035	157	200	Fill over natural silty clay overlying coral shelf	No significant finds
T-036	160	212	Fill over natural silty clay loam overlying coral shelf	No significant finds
T-037	97	132	Fill over natural sandy clay loam overlying a coral shelf	No significant finds
T-038	258	270	Fill over natural gleyed sandy clay to the water table (253 cmbs)	No significant finds
T-039	128	200	Fill over natural silty clay to the water table (190 cmbs)	No significant finds
T-040	45	45	Fill to the water table (38 cmbs)	No significant finds
T-041	107	230	Fill over natural clay overlying decomposing bedrock	No significant finds

Test Excav. No.	Max Depth of Fill (cmbs)	BOE (cmbs)	Stratigraphy	Contents
T-042	191	191	Fill over a concrete slab	SIHP # -7421, Feature 2, concrete slab
T-043	305	305	Fill over natural gravelly sandy clay overlying decomposing coral shelf	No significant finds
T-044	221	250	Fill over natural gravelly sandy clay overlying decomposing coral shelf	No significant finds
T-045	50	50	Fill to BOE	No significant finds
T-046	245	245	Fill to BOE	No significant finds
T-047	155	184	Fill over natural silty clay loam overlying coral shelf	No significant finds

Starting at the northwest end of Airport Section 3, it seems clear that the natural land surface in the vicinity of T-001 to T-004 was low-lying mudflats at the mouth of Hālawa Stream (See Figure 11). The 1.85+ m of fill in this area largely served to raise the land surface for a road that would become Kamehameha Highway. It seems probable that much of this fill was deposited prior to construction of the road first visible in 1933 shown in Figure 16.

It appears that from near the south bank of Hālawa Stream almost to Lagoon Station the Airport Section 3 corridor area and vicinity was under commercial sugar cane cultivation by the Honolulu Plantation (1899-1947). The numbered sequencing of fields in this area (see Figure 17), suggests expansion towards the coast with higher numbered fields being seaward. It seems probable that some movement of sediment onto seaward areas of bare tuff and shallow clay soils allowed for expansion of the plantation's sugar cane acreage, although no records have yet been located of this practice.

Reconstructing the history of the fill deposits is significantly complicated by what appears to have been the substantial development of the Airport Section 3 corridor during and after World War II, particularly in the vicinity of present-day Honolulu International Airport. The substantial fill and airport construction activities, especially those associated with 1942-1943, are readily apparent in a comparison of the 1933 (See Figure 16) and 1943 (see Figure 19) U.S. Army maps for this area. Fill activities extended the shoreline over 500 m southeast from the proposed Honolulu International Airport Station location. In the vicinity of the corridor, the area was developed rapidly as evidenced by the construction of roads and elongated warehouse-like buildings. There was likely substantial earth moving in the corridor and vicinity associated with this circa 1942-1943 military build-up. Perhaps not all of the 442,000+ active duty military stationed in Hawai‘i in 1944 (compared to < 28,000 in 1940; Schmidt 1977:661) were engaged in earth moving but this clearly was a major occupation. Additional activities associated with other land reclamation projects and various transportation (road and airport) improvement efforts before and after World War II further complicates the picture.

While the artifact assemblage was quite meager, the discovery of a beer bottle in T-018 (from a massive 1.25 m thick Stratum Ie extending down to 2.0 mbs) and a Coca-Cola bottle in T-041 (at 1.40 mbs) both manufactured in 1942 further support dating of overlying fill episodes to 1942 or later. The identification of concrete slabs buried under 1.81 m of fill in T-042 and asphalt beneath 2.90 m of fill in T-015 attest to the extensive land reclamation that occurred within the Airport Section 3 corridor and vicinity.

7.4 Cultural Resource Descriptions

7.4.1 Introduction to Airport Section 3

Table 10 summarizes the cultural finds identified as archaeological resources. Not included are disturbed or in situ historic refuse or features (e.g., a sign post) that lack integrity and/or content. Of the finds, ten structural remains are identified as components of two archaeological cultural resources, which are designated as SIHP # 50-80-13-7420 and # 50-80-13-7420-7421. These two sites are identified as consisting of structural remains of former pre-1950s roads, warehouse foundations, and other infrastructure. SIHP # -7420 and -7421 have integrity of location and information potential to be considered significant archaeological resources or historic properties eligible for the National and Hawai‘i Register of Historic Places.

Table 10. Archaeological Resources by Test Excavation

Provenience	Nature of Find	Comment
T-015, Stratum II, 286-290 cmbs	Asphalt roadway designated as SIHP # 50-80-13-7420, Feature 1	Associated with in situ asphalt in T-017 and T-018
T-017, Strata IIa and IIb, 80-155 cmbs	Asphalt pavement (IIa) and base course (IIb) designated as SIHP # 50-80-13-7420, Feature 2	Associated with in situ asphalt in T-015 and T-018
T-018, Strata IIa, IIb, and IIc, 25-200 cmbs	Asphalt pavement (IIa), concrete curbing (IIb), and coral fill base course (IIc) designated as SIHP # 50-80-13-7420, Feature 3	Associated with in situ asphalt in T-015 and T-017
T-018, Stratum IIc, 75-200 cmbs	Beer bottle (in fill) associated with SIHP # 50-80-13-7420, Feature 3	Isolated artifact manufactured in 1942
T-021, Strata IIa and IIb, 60-110 cmbs	Compact coral pavement (IIa) and coral base course (IIb) designated as SIHP # 50-80-13-7421, Feature 3	Probably relates to concrete slabs in T-023 through T-026, T-042, and T-046
T-023, Stratum II, 98-120 cmbs	Concrete slab designated as SIHP # 50-80-13-7421, Feature 1	Probably relates to concrete slabs in T-021, T-024 through T-026, T-042, and T-046
T-024, Stratum II, 108 cmbs	Concrete slab designated as SIHP # 50-80-13-7421, Feature 1	Probably relates to concrete slabs in T-021, T-023, T-025, T-026, T-042, and T-046,
T-025, Stratum II, 90 cmbs	Concrete slab designated as SIHP # 50-80-13-7421, Feature 1	Probably relates to concrete slabs in T-021, T-023, T-024, T-026, T-042, and T-046
T-026, Stratum II, 82 cmbs	Concrete slab designated as SIHP # 50-80-13-7421, Feature 1	Probably relates to concrete slabs in T-021, T-023 through t-025, T-042, and T-046

Provenience	Nature of Find	Comment
T-042, Beneath Stratum Id, 181 cmbs	Concrete slab designated SIHP # 50-80-13-7421, Feature 2	Probably relates to concrete slabs in T-021, T-023 through T-026, and T-046
T-046, Strata IIa, IIb, and IIc, 200-226 cmbs	Concrete (IIa), asphalt (IIb), and coral and basalt gravel base course (IIc) designated SIHP # 50-80-13-7421, Feature 2	Probably relates to concrete slab in T-021, T-023 through T-026, T-042

The beer bottle (collected from T-018, Stratum IIc, associated with SIHP # 50-80-13-7420, Feature 3) and Coca-Cola bottle (collected from T-041, Stratum II) were regarded as isolated artifacts, without any integrity of context. These two bottles indicate the fill layers they were found in date to 1942 or more recent.

The asphalt surfaces and concrete slabs have integrity of location, design and material, are over fifty years old; and have identifiable historic context based on available historic maps. These buried remnants are portions of two archaeological cultural resources. Their locations are shown on Figure 253 and Figure 254 and their descriptions are summarized below.

In consultation with the SHPD, two State Inventory of Historic Property (SIHP #) numbers have been assigned: SIHP # 50-80-13-7420 and SIHP # 50-80-13-7421 (Feature 1 to Feature 3). The buried remnants of the three roadway pavement segments observed in T-015, T-017, and T-018 are designated as components of SIHP # 50-80-13-7420 (Feature 1 through Feature 3). The buried remnants of concrete slabs in T-023, T-024, T-025, T-026, T-042, and T-046 and the crushed coral prepared roadway or paving surface (T-021), are designated as components of SIHP # 50-80-13-7421. Because the slabs identified in T-041, T-042, and T-046 were significantly south of the slabs identified in T-023, T-024, T-025, and T-026 these clusters are treated as two features (Feature 1 to the north and Feature 2 to the south). The crushed coral pavement and underlying coral base course are designated SIHP # 50-80-13-7420 Feature 3.

In addition to Figure 253 and Figure 254, the locations of these archaeological cultural resources are overlaid on a 1933 map (Figure 255), a 1943 map (Figure 256) and a 1953 map (Figure 257) of the Airport Section 3 corridor vicinity.

7.4.2 SIHP # 50-80-13-7420

Formal Type: Road

Number of Features: 3

Functional Interpretation: Vehicular transportation

Age: Post-Contact, early to mid twentieth century

Current Dimensions: Feature 1 was only observed in T-015, a 3.04 m long by 1.10 m wide excavation. Feature 2 was only observed in T-017, a 3.00 m long by 1.07 m wide excavation. Feature 3 was only observed in T-018, a 3.00 m long by 1.07 m wide excavation.

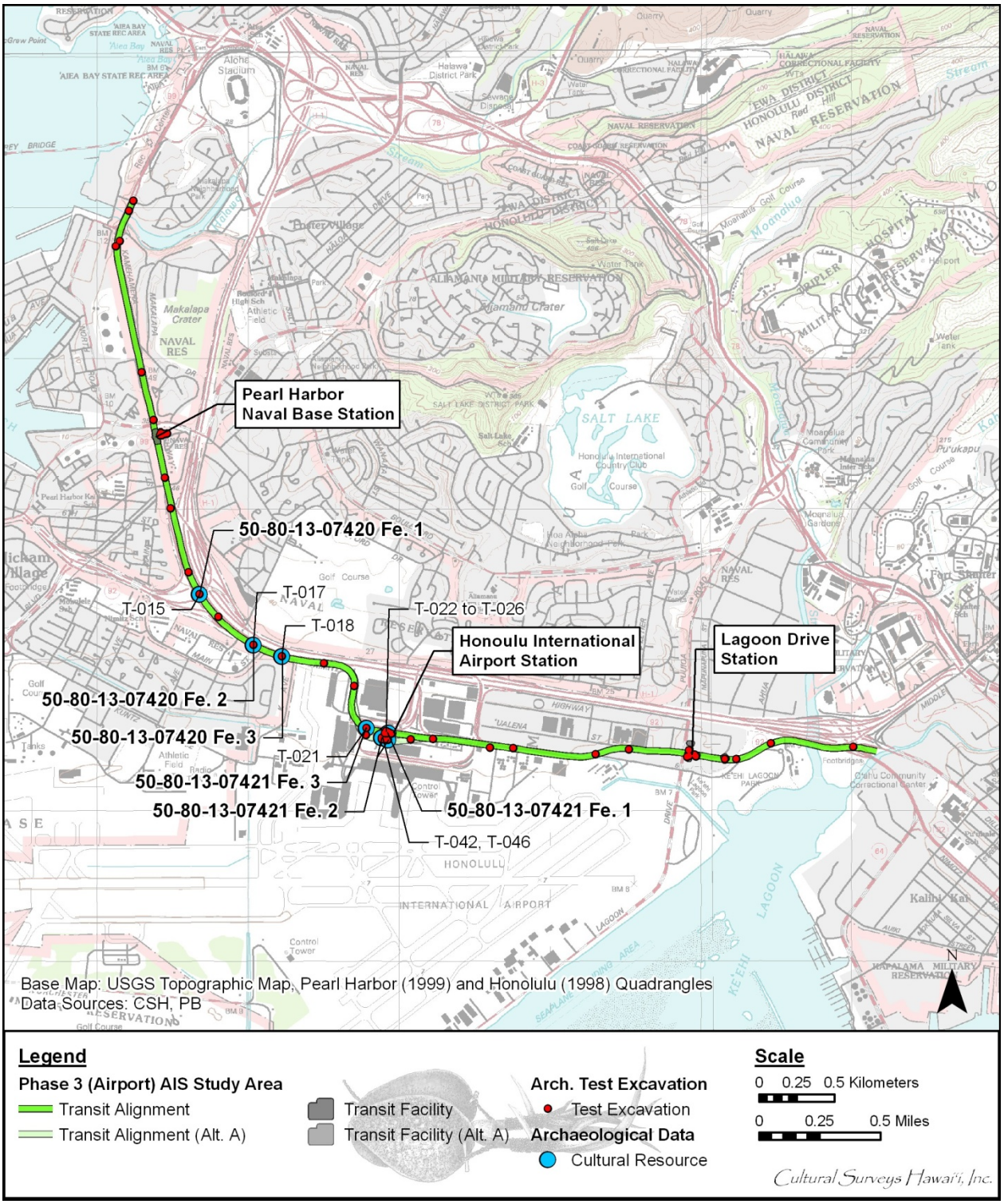


Figure 253. Locations of two archaeological cultural resources (SIHP # 50-80-13-7420 and -7421) identified in the Airport Section 3 corridor (on 1990s series U.S. Geological Survey maps)

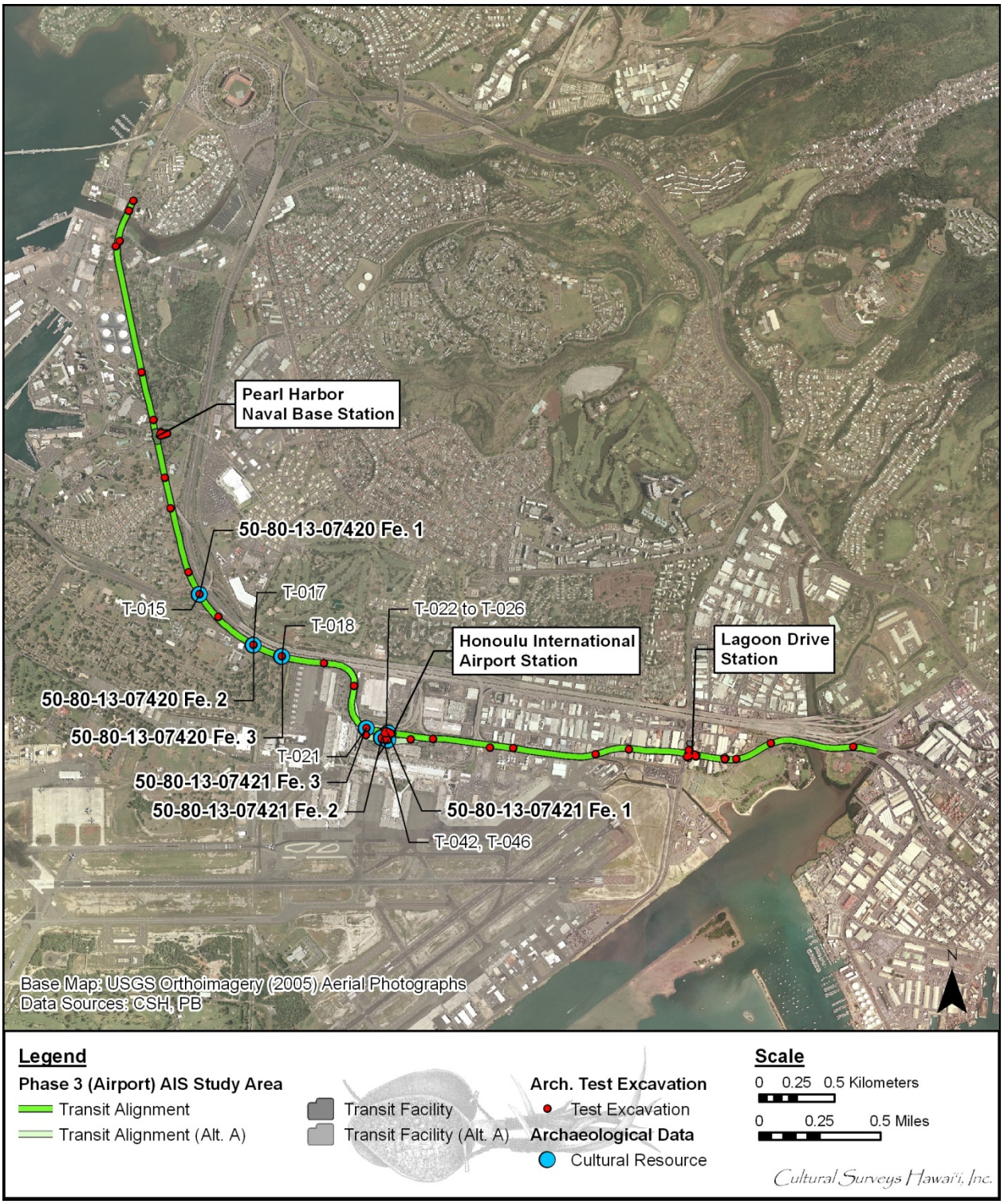


Figure 254. Locations of two archaeological cultural resources (SIHP # 50-80-13-7420 and -7421) identified in the Airport Section 3 corridor (on a 2005 U.S. Geological Survey Orthophotograph)

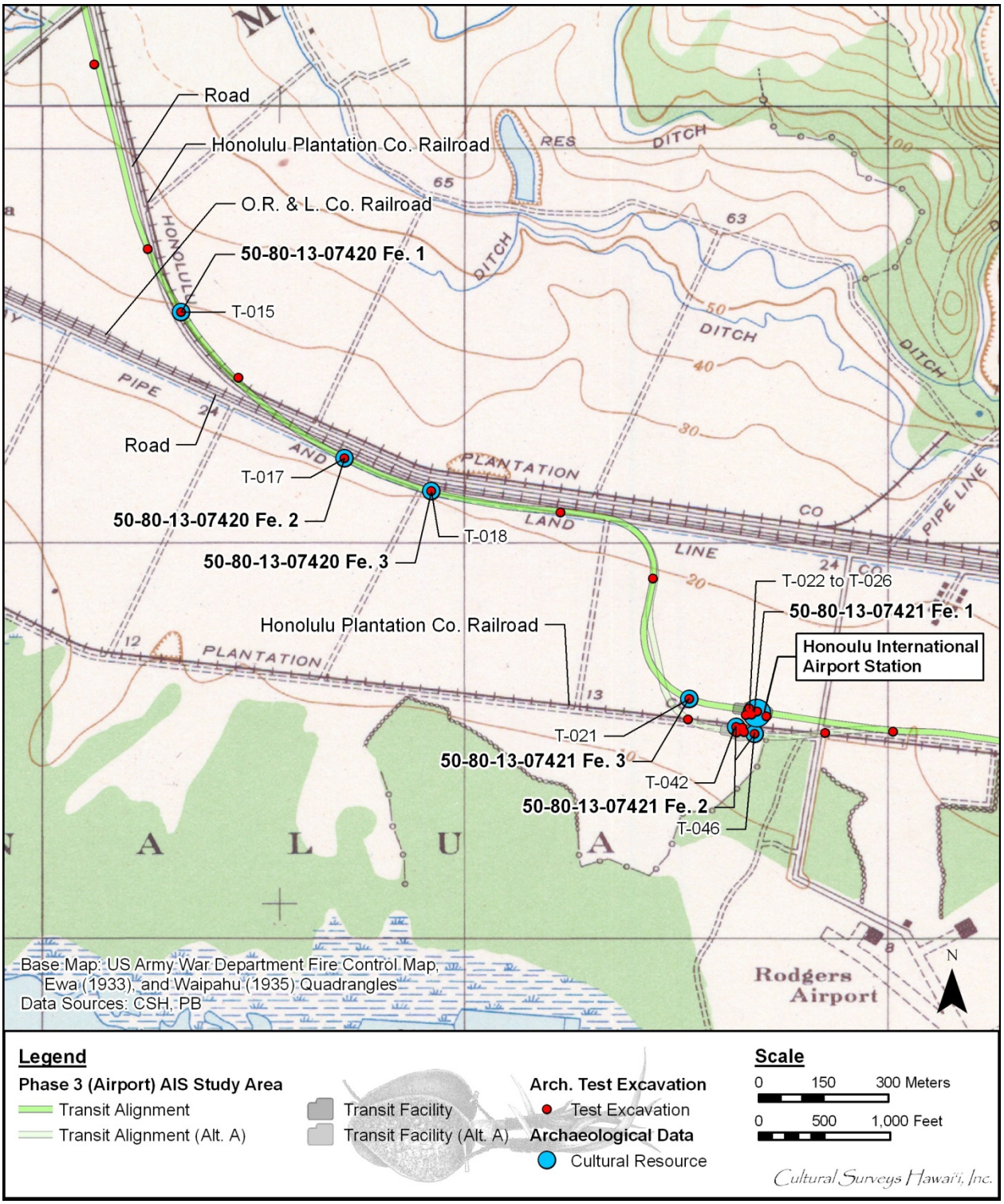


Figure 255. Locations of two archaeological cultural resources (SIHP # 50-80-13-7420 and -7421) identified in the Airport Section 3 corridor (on 1930s series U.S. Army War Department Fire Control)

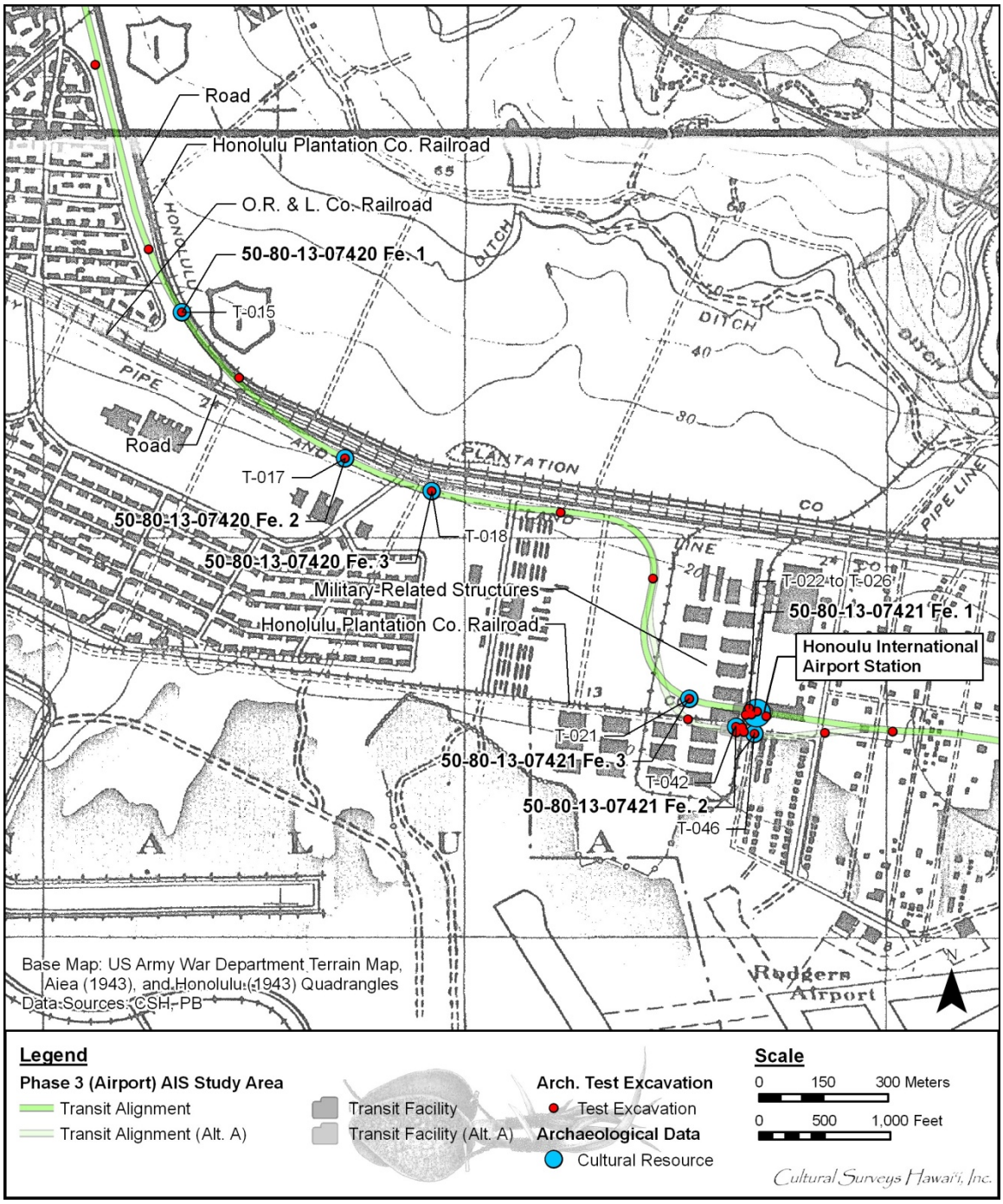


Figure 256. Portion of 1943 map showing warehouse-like structures, concrete slab locations (SIHP # 50-80-13-7421 Features 1 and 2) and coral pavement and base course (SIHP # 50-80-13-7421 Feature 3) within a train loop; note also locations of two asphalt remnants (SIHP # 50-80-13-7420 Features 1 and 2) that pre-date modern Kamehameha Highway

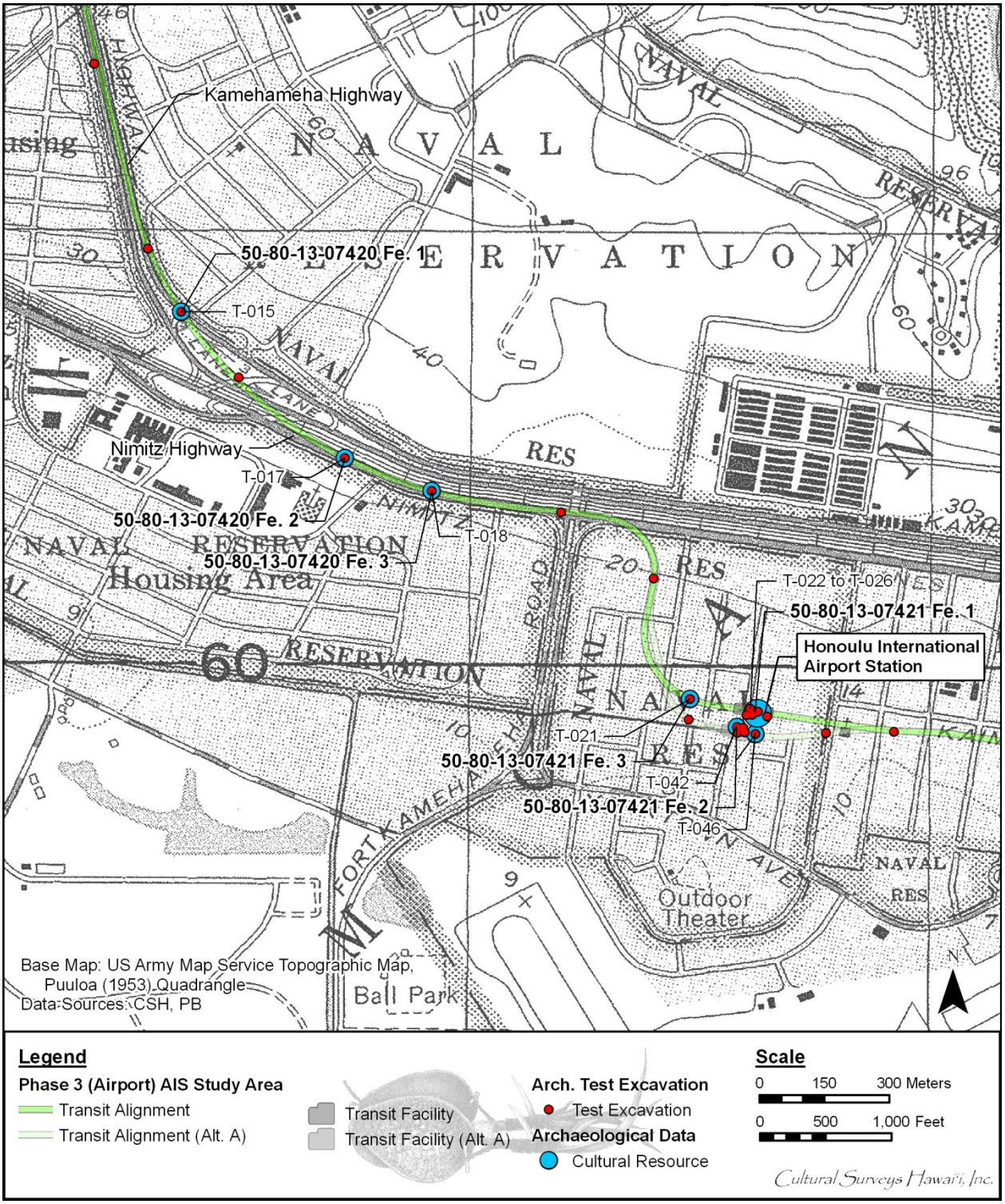


Figure 257. 1953 map showing a road on the *makai* (south) side of the railroad tracks where a buried asphalt pavement (SIHP # 50-80-13-7420 Feature 2) was identified

Location:	Feature 1 was identified in T-015, between the H-1 Freeway (east or *mauka*) and Makai Frontage Road (west or *makai*) and Features 2 and 3 were identified in T-017 and T-018 on the *makai* side of Nimitz Highway
Tax Map Key:	[1] 1-1-010 plat, 1-1-002:004
Land Jurisdiction:	State DOT Airports Division

SIHP # 50-80-13-7420 consists of three buried asphalt road sections, with the asphalt road remnant at T-015 designated as SIHP # 50-80-13-7420 Feature 1, the asphalt road remnant at T-017 designated as SIHP # 50-80-13-7420 Feature 2, and road remnants in T-018 designated as SIHP # 50-80-13-7420 Feature 3 (see Figure 253 and Figure 254). Feature 3 consists of asphalt pavement, a concrete slab or curbing, and a coral base course. All three features are interpreted as remnants of an early 20th century (on 1933 map) road system in the area that were buried by subsequently modern development. The geographic extent of these roadway features described here reflects their limited exposure within the Airport Section 3 AIS test excavations. It is likely that similar features may be preserved in untested areas in the vicinity of T-015, T-017, and T-018.

SIHP # 50-80-13-7420 Feature 1

All that was observed of SIHP # 50-80-13-7420 Feature 1 was a buried asphalt pavement encountered at 2.86 mbs (Stratum II) spanning the length and width of T-015. The excavation sidewalls of T-015 were fairly unstable, consisting of unconsolidated fill material with loosely held cobbles and boulders. Because shoring was not possible, the archaeologists could not enter T-015 to more completely document the asphalt roadway surface. The asphalt is at least 0.4-m thick, but because safety concerns necessitated terminating excavation, the overall thickness of the asphalt remains unknown. The asphalt's resistance to backhoe excavation indicated it is compact and well made.

A close-up of a 1933 map (see Figure 255) indicates that the buried roadway surface identified in T-015 was a former alignment of what is now Kamehameha Highway that it was constructed immediately adjacent to the *makai* side of the OR&L rail line perhaps circa 1930. Subsequent realignments of Kamehameha Highway appear to have left this former alignment within a landscaped median strip.

By inference from historic maps (see Figure 255 and Figure 256) this stretch of former road may have extended in a northwest/southeast direction (particularly to the southeast) for 100 m or more.

SIHP # 50-80-13-7420 Feature 2

All that was observed of SIHP # 50-80-13-7420 Feature 2 was a buried asphalt pavement at 0.80-0.95 mbs (Stratum IIa) spanning the length and width of T-017. This 0.15-m thick asphalt paving overlays a 0.60-m thick crushed coral roadway base course layer (Stratum IIb). The excavation easily continued through the asphalt suggesting that it was a relatively minor (i.e., not heavily travelled) roadway.

Based on T-017's overlay on historic maps, SIHP # 50-80-13-7420 Feature 2 was located on the seaward side of the OR&L alignment and does not show up on the 1943 map (Figure 256). It

does appear to be present on the 1953 map (Figure 257). It is unclear whether this was a minor development of the WWII build-up, but it seems likely that the road was abandoned and covered soon after. Nothing other than a 1940s-early 1950s roadway is indicated.

SIHP # 50-80-13-7420 Feature 3

SIHP # 50-80-13-7420 Feature 3 consists of buried roadway remnants including a concrete curbing section found immediately beneath asphalt paving. This roadway feature was documented in T-018. The overlying asphalt (Stratum IIa) was 0.20 m thick and extended from 0.25 to 0.45 mbs. The underlying concrete curbing (Stratum IIb) was 0.30 m thick and extended from 0.45 to 0.75 mbs. The asphalt extended across the entire trench footprint, but the deeper concrete curbing extended only along the entire length of the southeast sidewall. As with Feature 2 described above, a thick (1.2 m) layer of crushed coral fill (Stratum IIc) had been deposited beneath pavement and curbing, potentially as a roadway base course.

Cleaning and inspection of T-018 revealed that the concrete curbing (Stratum IIb) was smooth and lacked noticeable form scars from when the concrete was poured. The regularity of the poured concrete feature's surface and the lack of form scars indicate that the curbing was installed in a standardized, potentially repetitive manner, and that it was produced by skilled labor. The lack of observed seams in the curbing for the entire 3-m section exposed in the sidewall of T-018 indicates that the curbing was produced in relatively large pours, more on an industrial scale. The concrete curbing was well preserved and unweathered.

A single isolated beer bottle was recovered from Stratum IIc (designated as a component of SIHP # 50-80-13-7420), the crushed coral fill directly beneath the roadway asphalt and concrete curbing. The Regal Amber Brewing Co. bottle was manufactured in San Francisco in 1942 (see Artifact Analysis Section, 8.1 and Figure 260), clearly indicating that the thick crushed coral fill layer was deposited in 1942 or later.

That the Feature 3 roadway feature dates to 1942 or later coincides with evidence from historic maps. Based on T-018's overlay on historic maps, SIHP # 50-80-13-7420 Feature 3 was located on the seaward side of the OR&L alignment and does not show up on the 1943 map (Figure 256). It does appear to be present on the 1953 map (Figure 257).

SIHP # 50-80-13-7420 Significance

The identified asphalt pavement and concrete curbing features of SIHP # 50-80-13-7420 are not spectacular archaeological cultural resources. Based on their stratigraphic position, their plotted location in relation to mid-twentieth century roadways shown on historic maps, and the characteristics of the features themselves, they are older than 50 years. They appear to relate to the network of territorial government and military roadways that were developed in the 1930s and 1940s as Kamehameha Highway was constructed and the area was opened up for development.

SIHP # 50-80-13-7420 is an archaeological site; it is buried and not to be confused with surface, in-use, or remnant roadway structures. It maintains integrity of location, design, materials, and potentially of workmanship (if more were to be exposed). It has information to impart related to the geographic distribution/extent, materials, and construction methods of these early- to mid-twentieth century roads. The geographic information can be used to supplement and validate information available from historic maps. Archaeological data on roadway materials

and characteristics (such as asphalt thickness and the presence of form scars on poured concrete features) can inform on construction methods.

Accordingly, CSH recommends SIHP # 50-80-13-7420 eligible to the Hawai‘i Register of Historic Places and the National Register of Historic Places under Significance Criterion D (has yielded, or is likely to yield, information important for research on prehistory or history). This information has been recorded in T-015, T-017, and T-018 in the form of the geographic locations of these cultural resources, the materials used in their construction, and the construction methods used to create these early- to mid-twentieth century roadways. Potential exists for additional pavements to exist in the vicinity, which may also yield additional information about these roadways.

The historic archaeological remnants of this roadway network are buried and their surroundings have been completely altered by modern development since their time of construction and period of use (for example, the massive construction of the H-1 Viaduct immediately adjacent). Accordingly these features do not maintain the integrity of setting, feeling, and association that might convey the roadways' significance under any other significance criteria of the Hawai‘i or National Register of Historic Places.

7.4.3 SIHP # 50-80-13-7421

Formal Type:	Foundations (concrete slabs) and road surface
Number of Features:	3 (Feature 1, *mauka* section of concrete slabs; Feature 2, a *makai* section of concrete slabs, and Feature 3, the crushed coral road surface and underlying coral base course)
Functional Interpretation:	Storage and vehicular transportation
Age:	WWII
Current Dimensions:	170 m east/west by 80 m north/south
Location: Excavations	T-021, T-022, T-023, T-024, T-025, T-026, T-042, and T-046
Tax Map Key:	[1] 1-1-003:001
Land Jurisdiction:	State DOT Airports Division

SIHP # 50-80-13-7421 consists of two sections of buried concrete slabs and a crushed coral road surface and base course located at and near the Honolulu International Airport Station and Alternate A Station locations. A *mauka* section of concrete slabs (documented in T-023, T-024, T-025, and T-026 at the Honolulu International Airport Station) is designated as SIHP # 50-80-13-7421 Feature 1, a *makai* section of concrete slabs (documented in T-042 and T-046 located at the Alternate A Station) is designated as SIHP # 50-80-13-7421 Feature 2, and the crushed coral road surface and underlying coral base course (documented in T-021 just *‘ewa* of the Honolulu International Airport Station) is designated SIHP # 50-80-13-7421 Feature 3 (see Figure 253 and Figure 254).

A 1943 War Department map (Figure 256) indicates that within the military infrastructure development in 1942-1943, an extensive area of large warehouses was developed in the

immediate area of SIHP # 50-80-13-7421. Additionally, a railroad spur line ran south from the OR&L rail line forming a loop in the immediate vicinity of SIHP # 50-80-13-7421. It seems likely that the Features 1 and 2 concrete slabs were prepared, hard surfaces, possibly functioning as receiving aprons, docks, or warehouse foundations, and the Feature 3 crushed coral road with an underlying coral base course likely facilitated the mass movement of large quantities of heavy material and supplies from the rail line spur to the adjacent warehouses. A 1953 Army Mapping Service map (Figure 257) no longer depicts distinct structures. Instead, the area around SIHP # 50-80-13-7421 is shaded, indicating developed lands. It appears that in subsequent years, the concrete slabs and crushed coral road surfaces were abandoned and covered over when (or after) the warehouse buildings were demolished.

SIHP # 50-80-13-7421 Feature 1

SIHP # 50-80-13-7421 Feature 1 is comprised of buried concrete slabs or slab remnants located at varying depths within test excavations T-022, T-023, T-024, T-025, and T-026. In T-023 through T-026, Feature 1 consisted of a concrete slab overlain with a thin red film exposed beneath a modern asphalt parking lot and several underlying layers of fill. In each case, the concrete slabs extended beyond the limits of the excavation area. In T-022, an intact concrete slab was not encountered; however, large concrete slab pieces were documented within the upper portion of Stratum Id, beneath a modern asphalt parking lot and underlying fill layers. The total aerial extent of the slabs (which could be one or more large slabs spanning several trenches or several small slabs spanning one or more trenches) remains unknown. The total estimated area of the Feature 1 concrete slabs is minimally 50 m east/west by 15 m north/south, but it could be significantly greater and/or the shape of the area of the slabs could be irregular.

The buried slabs were encountered at varying depths within each trench. In T-022 the disturbed concrete pieces were encountered at about 0.90 mbs. In T-023 the concrete slab was encountered between 0.98 and 1.20 mbs. In T-024 the concrete slab was encountered at 1.08 mbs. In T-025 the concrete slab was encountered at 0.90 mbs. In T-026 the concrete slab was encountered at 0.82 mbs. These data indicate that the depth of the in situ concrete slabs decreased slightly from east to west (from T-023 to T-026). In addition, efforts to break through the in situ slabs were unsuccessful, suggesting their thickness is greater than 0.10 m.

SIHP # 50-80-13-7421 Feature 2

SIHP # 50-80-13-7421 Feature 2 is comprised of buried concrete slabs located at varying depths within test excavations T-042 and T-046. In both trenches, a concrete slab was encountered beneath a modern asphalt parking lot surface and several layers of fill. In each case, the concrete slab extended across the base of excavation (note that in T-046, this was a very small portion of the trench). As the concrete slabs appeared to extend beyond the boundaries of the trenches, the total aerial extent of the slabs remains unknown; however, concrete slabs were not encountered in adjacent excavations (T-043, T-044, and T-045) that lie between T-042 and T-046. This suggests that more than one concrete slab is present in this area and forms Feature 2.

In T-042 the concrete slab was encountered at 1.83 mbs. In T-046 the concrete slab was encountered at 2.0 mbs and was busted through using a jackhammer. This revealed that the concrete was 8.0 cm thick and overlay an asphalt pavement that was 0.6 m thick and had an underlying 11.0 cm thick coral and basalt gravel base course deposited atop fill material. The

asphalt pavement and underlying base course are included in the designation of SIHP # 50-80-13-7421 Feature 2.

SIHP # 50-80-13-7421 Feature 3

SIHP # 50-80-13-7421 Feature 3 is comprised of a compact crushed coral road surface and underlying coral base course exposed in test excavation T-021. The road surface and base course were encountered beneath fill layers. The road surface ranged in depth from 0.60 to 0.75 mbs and the coral base course measured 40.0 cm in thickness. As the pavement extended beyond the boundaries of the trench, its total aerial extent remains unknown.

SIHP # 50-80-13-7421 Significance

The identified crushed coral road surface and concrete slab features of SIHP # 50-80-13-7421 are modest archaeological cultural resources. Based on their stratigraphic position, their plotted locations in relation to mid-twentieth century roadways shown on historic maps, and the characteristics of the features themselves, they are older than 50 years and appear to relate to the military infrastructure development in 1942-1943. Although these features of SIHP # 50-80-13-7421 were developed in the same general timeframe as SIHP # 50-80-13-7420 Feature 1 (circa 1930) and SIHP # -7420 Feature 2 and Feature 3 (1940s-early 1950s), it seems clear that the crushed coral road surface and concrete slab features of SIHP # 50-80-13-7421 relate directly to WWII activities while the SIHP # 50-80-13-7420 features may relate more to general patterns of increasing development in the 1930s to 1950s.

SIHP # 50-80-13-7421 is an archaeological site; it is buried and not to be confused with surface, in-use, or remnant buildings or structures. It maintains integrity of location, design, materials, and potentially of workmanship (if more were to be exposed). It has information to impart related to the geographic distribution/extent, materials, and construction methods of these mid-twentieth roads. Their geographic distribution supplements and validates information available from historic maps, and their construction methods and materials contribute to understanding transportation infrastructure development of the area.

Accordingly, CSH recommends SIHP # 50-80-13-7421 eligible to the Hawai‘i Register of Historic Places and the National Register of Historic Places under Significance Criterion D (has yielded, or is likely to yield, information important for research on prehistory or history). This information has been recorded in T-021 through T-026, T-042, and T-046, including their geographic locations, and the materials and methods used in their construction. There is potential for obtaining additional information from untested locations within the vicinity.

The historic archaeological remnants of these warehouse structures and associated roadways are buried, and their surroundings have been completely altered by modern development since their time of construction and period of use (e.g., the massive construction of Honolulu International Airport immediately adjacent). Accordingly these features do not maintain the integrity of setting, feeling, and association that might convey their significance under any other significance criteria of the Hawai‘i or National Register of Historic Places.